MUSTANG SURVIVAL

MD4030 / MD4035 FR

COMPACT DAMAGE TOLERANT LIFE PRESERVER (DTLP)

DESCRIPTION AND MAINTENANCE INSTRUCTIONS

(US PATENT 6,453,840)
(CDN PATENT 2,392,416)

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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 GENERAL 1
1.2 CONTACT 1
1.3 RIGHTS RESERVED 1
1.4 RESPONSIBILITIES 2
1.5 TESTING 2
1.6 FIT 2
2.0 FEATURES 3
2.1 GENERAL DESIGN AND CONSTRUCTION 3
2.2 INFLATABLE CELL 5
2.3 AUTOMATIC CO_2 INFLATION DEVICE (USED IN MD4030 ONLY) 6
2.4 MANUAL CO_2 INFLATION DEVICE (USED IN MD4035 FR ONLY) 7
2.5 BALLISTIC CYLINDER PROTECTIVE POUCH 8
2.6 BEADED CO_2 INFLATION HANDLE 8
2.7 ORAL INFLATION TUBE 9
2.8 RESTRAINT LAYER 9
2.9 PROTECTIVE COVER 9
2.10 PROTECTIVE COVER ATTACHMENT POINTS 10
3.0 OPERATION 14
3.1 OPERATING INSTRUCTIONS 14
4.0 RE-ARMING INSTRUCTIONS 15
4.1 RE-ARMING THE MD4030 15
4.2 RE-ARMING THE MD4030 COMPACT DTLP WITH BALLISTIC CYLINDER PROTECTION 18
4.3 CONVERSION OF THE MD4030 BETWEEN AUTOMATIC AND MANUAL INFLATION 19
4.4 RE-ARMING THE MD4035 FR 20
4.5 RE-ARMING THE MD4035 FR WITH BALLISTIC CYLINDER PROTECTION Pouch 21
5.0 DONNING AND PACKING INSTRUCTIONS 25
5.1 GENERAL 25
5.2 ASSEMBLY, FOLDING AND PACKING INSTRUCTIONS 25
6.0 MAINTENANCE AND CARE 37
6.1 GENERAL 37
6.2 CLEANING 37
6.3 TREATMENT AFTER IMMERSION 37
6.4 SERVICE LIFE 38
6.5 WORK AREA 38
6.6 STORAGE 38
6.7 EQUIPMENT REQUIRED 38
6.8 MAINTENANCE REPORTING 38
7.0 INSPECTION AND TESTING 39
7.1 REQUIREMENTS 39
7.2 INSPECTION UPON RECEIPT FROM SUPPLY DEPOT 39
7.3 PRE-USE AND POST-USE INSPECTION 39
7.4 VISUAL INSPECTION 39
7.5 MAINTENANCE INSPECTION 40

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7.6 ORAL INFLATOR VALVE TEST 41
7.7 INFLATABLE CELL TEST 42
7.8 CO_2 INFLATION DEVICE TEST 42
7.9 CO_2 CYLINDER INSPECTION AND WEIGHT TEST 43
8.0 REPAIRS 45
8.1 GENERAL 45
8.2 IDENTIFICATION OF DEFECTS 45
8.3 PROTECTIVE COVER AND ATTACHMENT ASSEMBLY 45
8.4 SEWING 46
8.5 INFLATABLE CELL 48
8.6 CO_2 INFLATOR 48
8.7 RESTRAINT LAYER 48
8.8 CO_2 CYLINDER 48
9.0 ACCESSORIES 50
9.1 MA4050 BALLISTIC CONTAINMENT POUCH 50
9.2 MA4060 RE-ARM KIT, STANDARD (FOR MD4030) 50
9.3 MA4060 DT RE-ARM KIT, DAMAGE-TOLERANT (FOR MD4030) 51
9.4 MA4065 RE-ARM KIT (FOR MD4035 FR) 51
10.0 ILLUSTRATED PARTS LIST 53

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1.0 INTRODUCTION

1.1 GENERAL

1.1.1 The MD4030 and MD4035 FR Compact Damage Tolerant Life Preservers (DTLP) are each comprised of a life preserver and mounting assembly. These devices are designed to be, attached to the Pouch Attachment Ladder System (PALS) webbing found on most Modular Light-weight Load-bearing Equipment (MOLLE) including Body Armor carriers and tactical vests. They are intended to operate in any scenario and are capable of functioning in the event of ballistic penetration or other damage to a single lobe. This series of the DTLP are compact in profile and are designed primarily for use in threatening environments where the risk or potential damage to this life preserver's bladder may exist. The DTLP provides a minimum of 65 lbs of buoyancy when both bladders are inflated and is designed to self-right an individual carrying equipment in a face-up position. The device also offers a half-buoyancy inflation mode using a 2-Stage (Secondary) Breakout Zipper that allows two modes of inflation for light or heavy kit duty.

WARNING: Due to differing material densities of equipment carried, the weight of the equipment may not be the same on land as it is in the water. The life preserver should be tested with actual or simulated equipment to verify positive buoyancy. Failure to do so may result in drowning. Contact Mustang Survival Corp. for more specific information regarding this requirement.

1.1.2 The MD4030 is designed primarily for maritime operations where automatic inflation may be required. When submerged in water, this device automatically inflates and is designed to self-right an unconscious user. The MD4030 life preserver is universal in size and fit and uses an automatic inflator that can be converted between auto or manual settings.

1.1.3 The MD4035 FR is designed primarily for over water aviation operations. The MD4035 FR is inflated manually by pulling the beaded handle after successful egress from an aircraft. The MD4035 FR life preserver is universal in size and fit.

1.2 CONTACT

For further information concerning this manual or the Compact DTLP, contact:

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1.3 RIGHTS RESERVED

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1.4 RESPONSIBILITIES

1.4.1 The individual to whom the Compact DTLP is issued or assigned, following internal training, assumes responsibility for pre and post use inspections and for returning the Compact DTLP to the Maintenance Shop for periodic inspection and testing on required dates.

1.4.2 Each operational organization is responsible for the instruction and survival training of all Compact DTLP users in the following:

a. Fitting and operation of the Compact DTLP.

b. Use and operation of all Compact DTLP furnished equipment accessories.

c. Visual, pre and post use inspections.

1.4.3 The Life Support Facility is responsible for:

a. Periodic inspection and testing of the Compact DTLP.

NOTE: The inspection interval should not exceed 360 days (see Section 7.0).

b. Inspection when first issued from a Supply Depot or contractor and prior to issue for service.

c. Maintenance, cleaning, and repair when required.

d. Ensuring that the device is properly armed and serviceable prior to issue.

e. Requisitioning and maintaining an inventory of spare parts.

f. Maintenance of inspection records of all Compact DTLPs.

1.5 TESTING

All Compact DTLP's are tested to ensure the highest level of reliability and performance. Mustang Survival offers superior quality under rigid QA standards which are certified to ISO-9001.

1.6 FIT

When a Compact DTLP is initially issued to personnel, it shall be individually fitted to the wearer as fit may vary with equipment integration. The wearer shall be fully instructed in the donning and adjustment procedures.

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2.0 FEATURES

2.1 GENERAL DESIGN AND CONSTRUCTION

2.1.1 Mustang Survival MD4030 and MD4035 FR Compact DTLP's are designed to provide flotation in case of immersion in water, minimizing the risk of drowning. The MD4030 inflates automatically upon water submersion to a depth of approximately 4 to 6 inches water depth. (unless the Manual Conversion Cap is in use which disengages this feature). The MD4035 can only be inflated manually by pulling its beaded-handle inflation toggles. Both are also designed to be worn over the top of body armor and in the event of direct ballistic penetration to one lobe, have a redundant system that will provide a fully functional life preserver at a reduced buoyancy (approximately 35 lbs, or half of design buoyancy).

2.1.2 The life preserver assembly consists of three major components:

a. Inflatable Cells

b. Restraint Layer

c. Protective Cover

2.1.3 Figures 1 through 3 list the features of the Compact DTLP.

NOTE: All location reference points in this section are based from the perspective of the person wearing the Compact DTLP.

Figure 1. Component Locations (Front View)

Water Ingress Grommets (for Automatic Inflation)
Protective Cover
MOLLE Vest (Not included)
Adjustable Chest Strap
Mounting Attachment Buckles (Front)
Beaded Inflation Handles & Inflator Access Zippers

[MD4035 FR Shown]

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Figure 2. Component Locations (Profile View)

[MD4035 FR Shown]

Figure 3. Component Locations (Rear View)

[MD4035 FR Shown]

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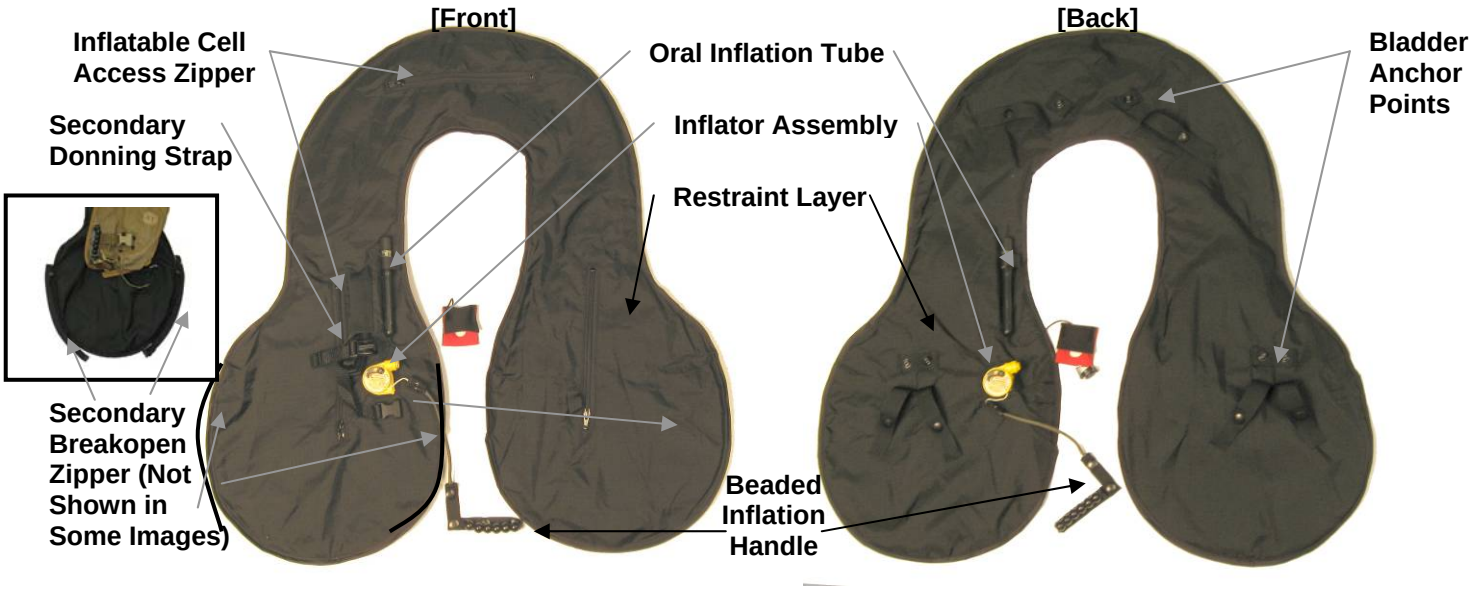
2.2 INFLATABLE CELL

2.2.1 The inflatable cells are constructed using polyurethane coated nylon fabric.

[MD4030 Shown]

Figure 4. Life Preserver



2.2.2 The life preserver is comprised of two discrete inflatable cells which operate independent of one another. Each inflatable cell folded and placed into one half of the restraint layer (either right or left). When both inflatable cells are activated, the device functions to fill the entire restraint layer and operate as a fully functional Personal Flotation Device (PFD) providing a minimum of 65 lbs. Buoyancy. If only one inflatable cell is activated, the cell will inflate into restraint layer, providing approximately 35 lbs. (half) buoyancy. Inflation of the second cell by pulling the beaded inflation handle or blowing into the oral inflation tube can provide the full functional buoyancy.

WARNING: Inflating only one chamber may result in partial deployment and decreased buoyancy of the life preserver.

NOTE: When configured for automatic operation, the MD4030 Compact DTLP will inflate when submerged in water to a depth of at least 4 inches.

2.2.3 Normal manual or automatic inflation by carbon dioxide gas (CO_2) from a stored cylinder, fully inflates either chamber. Either chamber may be inflated by mouth, and provides redundancy in the event one of the chambers is damaged, requires topping up, or fails to operate for any reason. Air can also be vented using the same valve to provide lower pressure cells for additional comfort or mobility.

2.2.4 When inflated, the cell forms a yoke around the back of the user's neck, extending into two lobes down the user's chest.

2.2.5 A Secondary Donning Strap is provided on the top of the right lobe. This strap is stored in an elastic pouch and can be extracted to provide a more secure attachment. Once extracted, the

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strap should be passed through loop on the top of the left lobe, around the back and reattached to the buckle on the top of the right lobe. The strap can be adjusted to secure the lobes against the waist and improve flotation characteristics.

2.2.6 Each side also has a secondary breakopen zipper along the edge of lower lobe. This zipper provides the feature that the device can be configured in an optional half-buoyancy flotation mode, in addition to the standard 65 lb inflation mode. See packing instructions for more details.

NOTE: Not all images clearly show the secondary breakout feature.

2.2.7 A webbing and snap assembly is used to attach the cover to the restraint layer. Webbing straps are used secure the restraint layer to the protective cover 'pull-the-dot' snaps. This provides a secure anchor of the restraint layer to the protective cover.

2.2.8 The Compact DTLP is designed to provide a minimum buoyancy 65 lbs. (289 N), when fully inflated with two cylinders of carbon dioxide (CO_2) gas stored in ambient temperatures above 0° C (32° F). The MD4030 utilizes two 33 gram cylinders and the MD4035 FR uses two 35 gram cylinders.

2.3 AUTOMATIC CO_2 INFLATION DEVICE (USED IN MD4030 ONLY)

2.3.1 The MD4030 incorporates an automatic inflator. The operating components of the automatic inflator (Hammar 1F Auto Inflator) are shown in Figure 5. The MD4030 can be configured for manual-only operation by installing the Manual Conversion Cap (P/N MA7219)

2.3.2 The MD4030 incorporates one automatic inflator on each inflatable cell. A 33 gram carbon dioxide (CO_2) cylinder is threaded into each inflator. The cylinder may or may not be fitted with a Damage Tolerant Ballistic Cover. Each automatic inflator needs to be submerged in at least 4 inches (10 cm) of water to open a pressure valve releasing a firing mechanism and automatically inflating the PFD. The MD4030 will not inflate prematurely due to rain, humidity or excess moisture. The MD4030 can be inflated manually by pulling the beaded inflation handle). Each inflator is marked with an expiration date and includes a status window indicating the condition of the inflator and cylinder. Green indicates the device is ready for use. See Re-Arming Instructions in Section 1.04.1 or Section 1.04.2, as applicable.

WARNING: When fitted with a Manual Conversion Cap (P/N MA7219) theMD4030 Compact DTLP will not inflate automatically when submerged in water.

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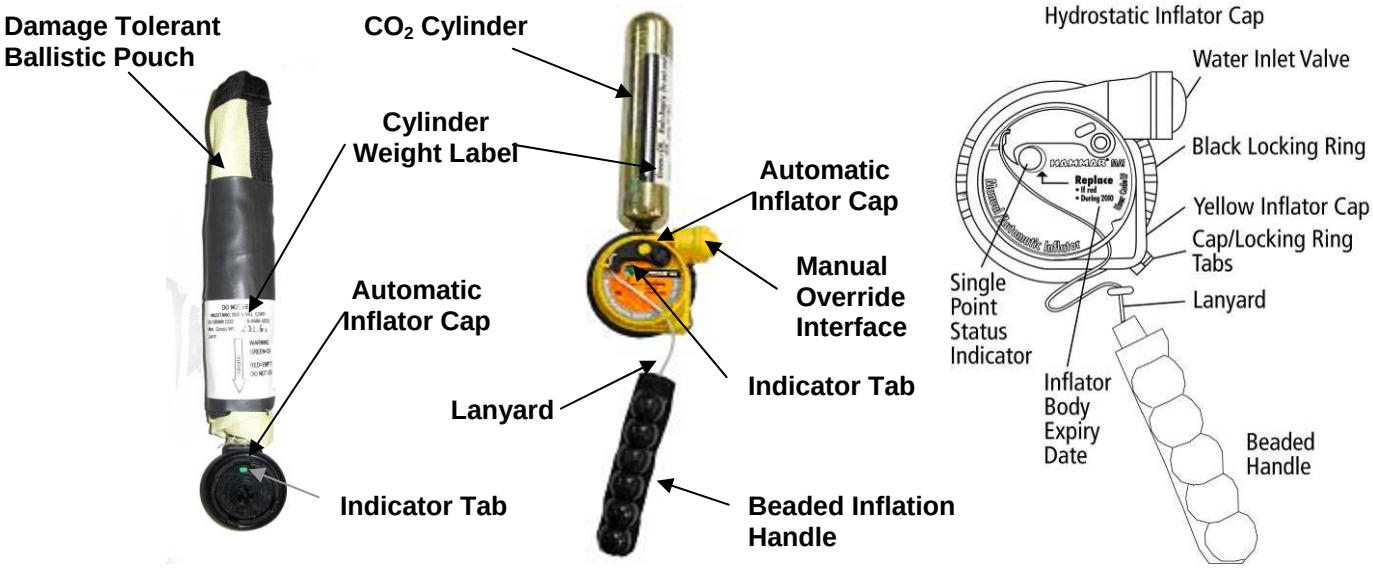
Figure 5. MD4030 Automatic/Manual CO2 Inflation Device SHOW MA7219



2.4 MANUAL CO_2 INFLATION DEVICE (USED IN MD4035 FR ONLY)

2.4.1 The MD4035 FR incorporates a manually operated inflator. The operating components of the manual inflator (Halkey-Roberts 6F Manual Inflator) are shown in Figure 6.

2.4.2 The MD4035 incorporates one manual inflator on each inflatable cell. There are two manual inflation devices: one located on each inflatable cell. A 35g carbon dioxide (CO_2) cylinder is threaded into each inflator. The cylinder may or may not be fitted with a Damage Tolerant Ballistic Cover. The MD4035FR can be inflated pulling on the beaded handle. A green safety pin is visible on the outer portion of the inflator body and locks the inflation lever to prevent accidental inflation. The safety pin is easily broken when intentionally pulling on the beaded handle. See Re-Arming Instructions in see Section 1.04.4 or Section 1.04.5, as applicable.

Warning: The MD4035 FR Compact DTLP will not inflate automatically when submerged in water and can only be deployed by the activation using the beaded handle and inflation lanyard.

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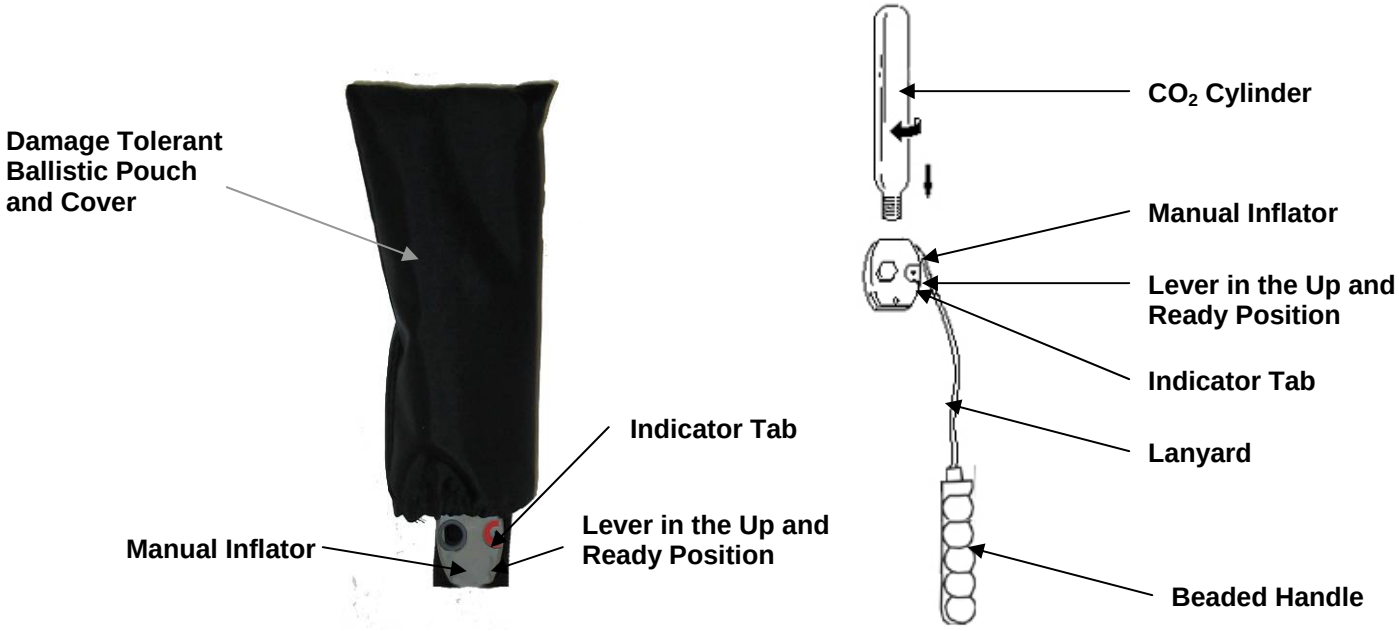
Figure 6. MD4035 FR Manual CO2 Inflation Device

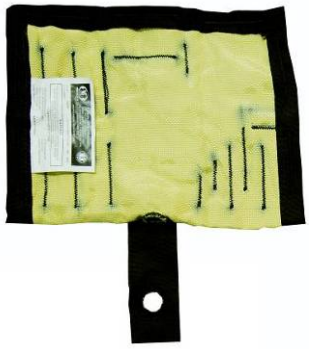


2.5 BALLISTIC CYLINDER PROTECTIVE POUCH

2.5.1 Each inflatable cell is equipped with a Ballistic Cylinder Protective Pouch (MA4050) (Patent Pending by Pacific Safety Products). The pouch is designed to contain the cylinder in the event of catastrophic cylinder failure and prevent the cylinder from becoming a hazardous projectile..

2.5.2 The Ballistic Cylinder Protective Pouch may be attached to either the MD4030 or MD4035 FR.

Figure 7. MA4050 Damage Tolerant Ballistic Cylinder Pouch



2.6 BEADED CO_2 INFLATION HANDLE

2.6.1 The beaded inflation handle is designed to be easily recognized and provide a positive grip for inflation of the preserver with cold, wet or gloved hands.

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2.7 ORAL INFLATION TUBE

2.7.1 Each inflatable cell is equipped with an oral inflation tube and can be used to inflate or top up the cell.

2.7.2 The oral inflation tubes can also be used to regulate pressure within the inflatable cells. The relief valve is used to regulate the pressure within each cell and can be manually activated to evacuate the gas from the cell in the event of an emergency.

2.8 RESTRAINT LAYER

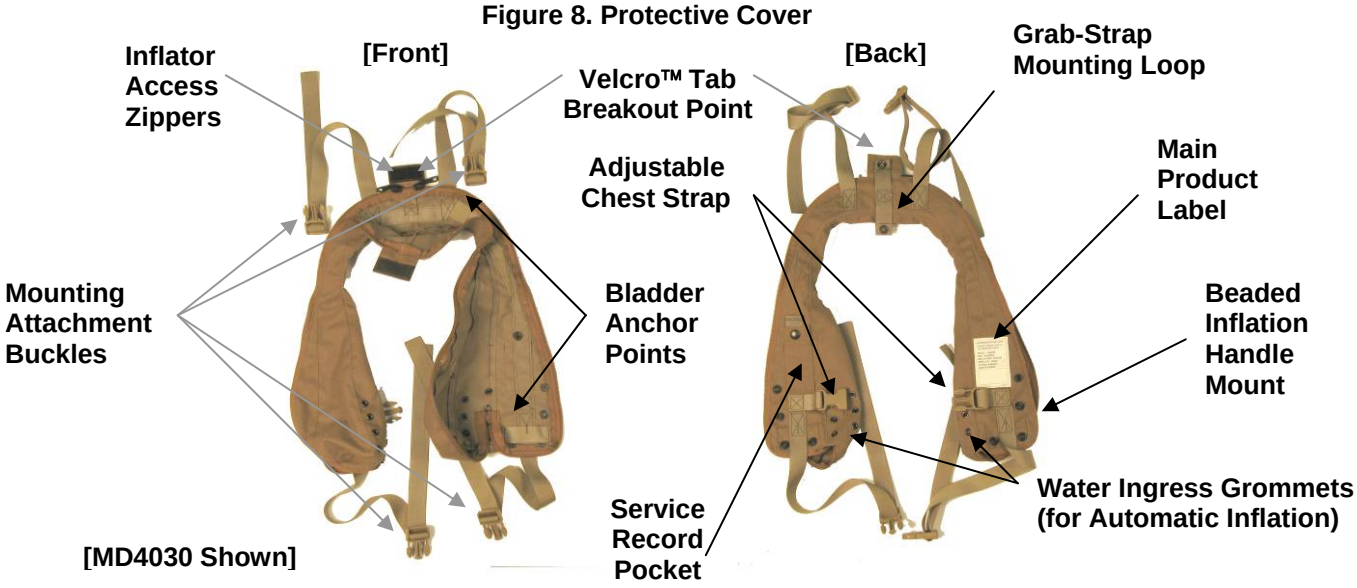
2.8.1 The restraint layer is attached to the life preserver cover using an interlocking webbing and snap system at four points. Four attachment points that interface with the cover are located on the restraint layer as shown in Figure 4 on . The inflatable cells, when folded and packed, are contained within the restraint layer and may be accessed by means of the cell access zipper system and a Velcro™ patch located at the rear at the zipper ends at the rear collar.

2.9 PROTECTIVE COVER

2.9.1 The outer protective cover is constructed of a heavy Cordura® nylon cloth, and in the case of the MD4035 FR, treated with a fire retardant coating that meet the requirements of ASTM-D-6413.

2.9.2 The cover incorporates a zipper closure system that can be opened via the break-away point at the back of the collar, or at either end lobe using the sliders.

Figure 8. Protective Cover



2.9.3 The protective cover is attached directly to any MOLLE system. The protective cover houses the life preserver , providing a compact protective.

2.9.4 The restraint layer is attached directly to the inside of the protective cover with a webbing and snap attachment system. The cell is neatly folded and packed within the cover, which is secured in the closed position with a system of slide fasteners, and a Velcro™ tab. The tail

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ends of the slide fastener tapes are protected by tucking the tails into the lower openings of the secured protective cover to finish the closure.

2.9.5 The protective cover's zipper on the MD4030 utilizes separate sliders on each half of the container to allow for inspection of inflator status.

2.9.6 The beaded inflation handle lanyard passes through the hole in the cover and is attached to the inflator.

2.9.7 The cover has an adjustable chest strap that permits adjustable lobe displacement.

2.10 PROTECTIVE COVER ATTACHMENT POINTS

2.10.1 The life preserver is intended to be secured to the user's Modular Load Carrying Equipment (MOLLE) Vest using the provided buckles. The attachment points secure the protective cover (and life preserver) to the front (2) and back (2) of the vest.

Figure 9. Compact DTLP Mounting System

[MD4030 Shown]

2.10.2 The female portion of the buckle is designed to mount to MOLLE systems, but allow easy removal of the life preserver to reconfigure for mission profiles. Placement of the attachment points should be done in a manner that:

1). does not interfere with other mounted equipment,

2). provides secure fit so that the life preserver is attached as close to the torso as possible,

3). the attachment points are accessible.

2.10.3 After mounting, each attachment point can be adjusted until tight and the life preserver is secure. The excess strapping can be secured using the keepers provided. The harness should be properly fitted to the user's vest to ensure proper performance of the life preserver.

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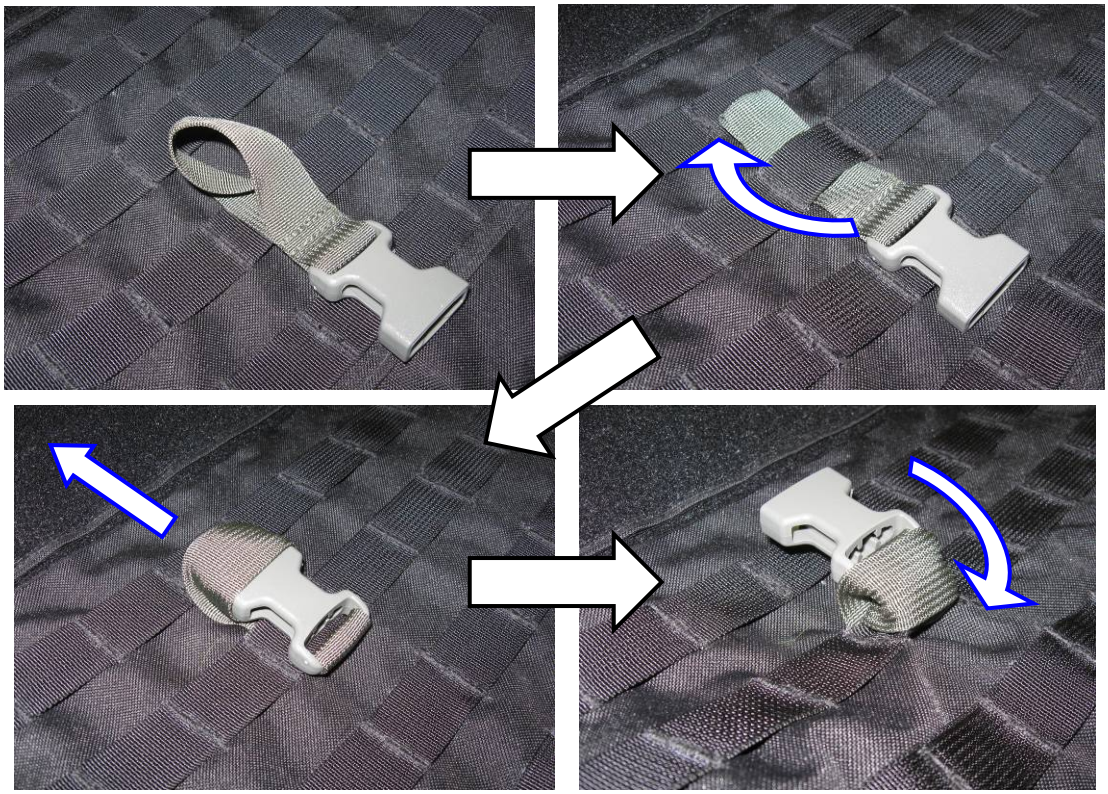
Figure 10. Half-Loop Female Buckle Attachment to MOLLE Webbing



NOTE: When properly donned, the smallest portion of the inflatable should be on top of the shoulder, in the neck area. The back collar should be off the neck and positioned down the back for optimum comfort.

Warning: The life preserver should not be worn on the inside of a ballistic vest to avoid injury during inflation. The life preserver is designed to take damage and perform as required and should be configured on the outside of any tactical ensemble.

2.10.4 The life preserver bladder and protective cover are attached and can be separated to perform maintenance.

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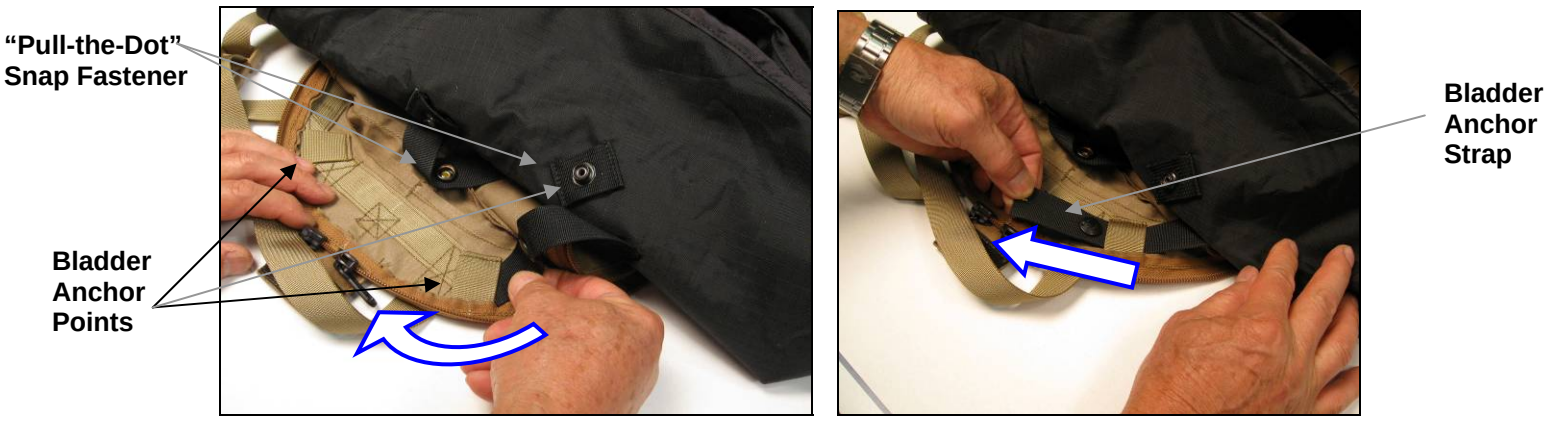
Figure 11. Webbing and Snap Attachment System at the Collar, Step a



2.10.5 The strap mounted on the life preserver restraint layer is fed through the corresponding anchor point assembly's pass-through on the protective cover (see Figure 11). The strap is then fed back through the adjacent life preserver restraint layer anchor point, effectively "lacing" the two bodies together (see Figure 12).

Figure 12. Webbing and Snap Attachment System at the Collar, Step b

2.10.6 The webbing is then turned over the second pass-through loop and attached to the "pull-the-dot" snap socket mounted on the assembly (see Figure 13). Once the snap dome is secured, the excess webbing can be tucked back into the loop assembly. Repeat the same process other mounting points on the life preserver. In the case of the lower lobes, there are two anchor points to assist with in-water performance by preventing inflated lobe rotation.

WARNING: Failure to close both snap and webbing assemblies on each lobe may result in improper flotation performance and malfunction of the life.

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Figure 13. Webbing and Snap Attachment System at the Collar, Step c

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3.0 OPERATION

3.1 OPERATING INSTRUCTIONS

3.1.1 Manual operation of the MD4030 or the MD4035FR life preserver is accomplished by grasping both beaded inflation handles located on the lower side of the protective cover. Jerking sharply downwards rotates the operating lever of the CO_2 inflator and forces the piercing pin to puncture the neck of the CO_2 cylinder allowing the compressed gas to flow into the inflatable cell. When configured for automatic operation, the MD4030 will inflate upon submersion in water.

***WARNING*: To achieve full deployment and performance both cells of the Compact DTLP must be fired.**

3.1.2 The MD4030 can be configured manually by installing the MA7219 Manual Conversion Cap (see Section 1.04.3). A protective neoprene cover is provided to encase the Manual Conversion Cap to prevent chaffing .

3.1.3 The MD4035 FR has no automatic inflation capability and must be manually activated.

3.1.4 When inflated the pressure of the expanding gas forces the break-away zipper to separate, automatically opening the protective container and allowing the cell to reach its fully inflated shape.

NOTE*: *Carbon dioxide gas does not remain in the life preserver indefinitely. Either of the oral inflator valves can be used as a means of compensating for normal cell leakage. The oral inflators are also provided as an emergency back up in the unlikely event that the CO_2 inflation device fails.

3.1.5 When configured, the device has an optional half-buoyancy / secondary-breakout mode which allows the device to be configured for light or heavy equipment operational loads The device can be armed with any combination of either or both inflators set to automatic or manual activation, and with or without secondary (2-stage) breakout, within operational and physical restrictions and capabilities.

3.1.6 The adjustable chest strap permits the use of variable lobe separation to allow for variable equipment integration. This strap adjustability will effect the performance of the life preserver when deployed into the water.

CAUTION*: *When the lobes are separated, the freeboard floatation and self-righting characteristics of the life preserver will likely be compromised.

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4.0 RE-ARMING INSTRUCTIONS

4.1 RE-ARMING THE MD4030

Warning: The automatic hydrostatic inflator used with the MD4030 is stamped with an expiration date. A Mustang Survival Re-Arm Kit (MA4060 or MA4060 DT) shall be used when replacing the inflator upon use or expiration. Use of other Re-Arm Kits may result in failure to operate and will void the product's warranty. Re-arm instructions are included with each kit.

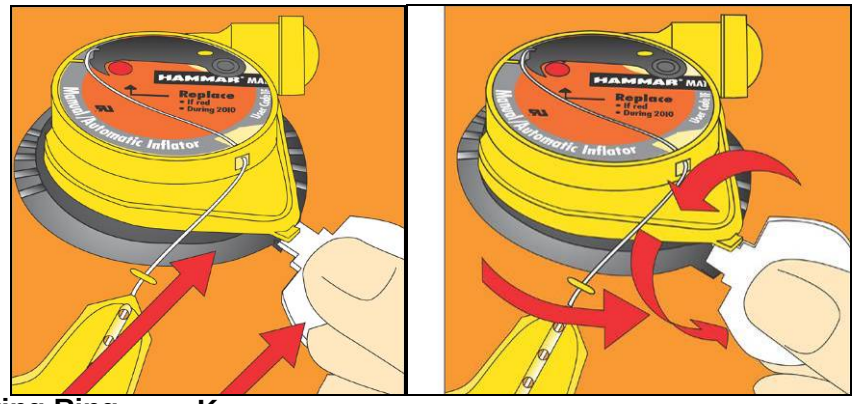
NOTE: The "Damage Tolerant" bladder will operate with or without the Ballistic Pouch. The MD4030 can be configured with the pouch for extra protection, or without the pouch in lower threat or training scenarios. The Ballistic Pouch when used with the auto-hydrostatic inflator CANNOT be re-used once the cylinder is fired, and must be replaced with either Re-Arm Kit, as appropriate.

a. To access the inflator system, open the cover's break-away zipper halfway (See Figure 14). Carefully open the cover and unfold the bladder. To avoid inadvertent inflation, detach the beaded handle while re-arming. Hold the CO_2 cylinder through the fabric, using one hand.

Figure 14. Re-Arming the MD4030 (Step a.)

b. Insert the metal key between the black locking ring and labeled yellow cap. Turn the key counter-clockwise (see Figure 15).

Figure 15. Re-Arming the MD4030 (Step b.)



Locking Ring **Key**

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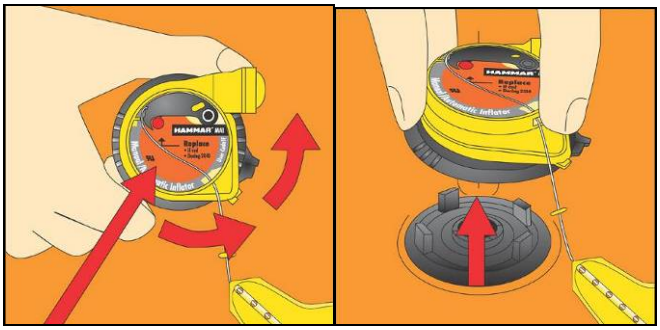
c. Turn the black locking ring counter-clockwise and lift off the cap (yellow inflator operating head per Figure 16). Unhook the inflation lanyard and beaded handle from the grommet (pulled through it's own loop secured to the grommet). Dispose of the used cap and keep the beaded lanyard assembly for the new inflator.

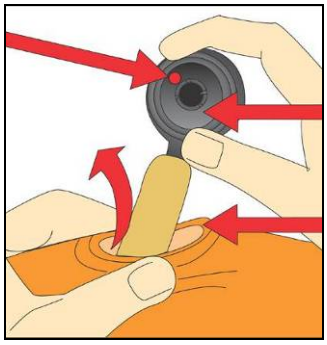
Figure 16. Re-Arming the MD4030 (Step c.)



Cap

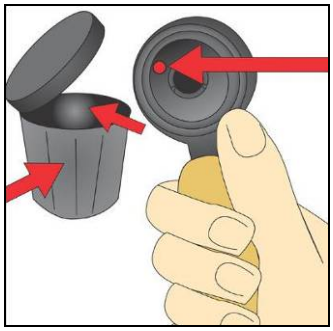
d. Squeeze the sealing ring to elongate and remove the inflator body assembly through the sealing ring (see Figure 17).

Figure 17. Re-Arming the MD4030 (Step d.)



e. Dispose of the used inflator body assembly. This assembly may or may not have the Damage Tolerant Ballistic Pouch.

Figure 18. Re-Arming the MD4030 (Step e.)



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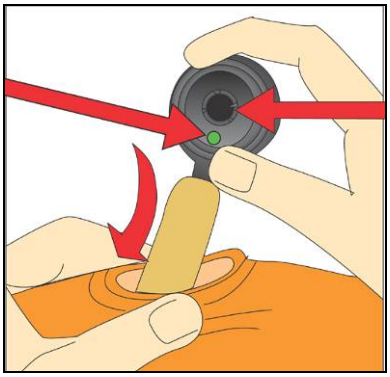
f. Using the inflator assembly from the MA4060 or MA4060 DT Re-Arm Kits, check that the new inflator body indicator is green. Insert the new inflator body with CO_2 cylinder assembly pointing upward inside the Inflatable PFD (see Figure 19). The MA4060 DT cylinder assembly will be encased in a Ballistic Pouch. Let the sealing ring rest on the adapter around the four lugs.

Figure 19. Re-Arming the MD4030 (Step f.)

Green Indicator



Caution: Do not turn the center shaft

g. Now check the new manual/automatic cap as follows (see Figure 20):

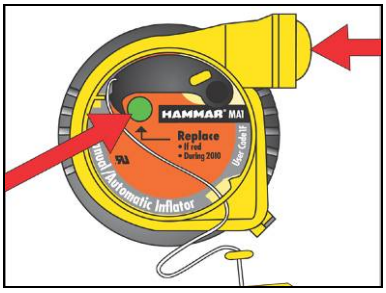
1. Is the single point status indicator showing green?

2. Is the expiration date OK?

If YES is the answer to both questions, then proceed as follows. If the answer is NO to either question, get a new cap.

Figure 20. Re-Arming the MD4030 (Step g.)

Water Inlet Valve



Single Point Indicator

h. Hold the CO_2 cylinder through the fabric of the Inflatable PFD. Position the replacement cap with the water inlet valve pointing to the right and press firmly onto the inflator body and sealing ring (see Figure 21).

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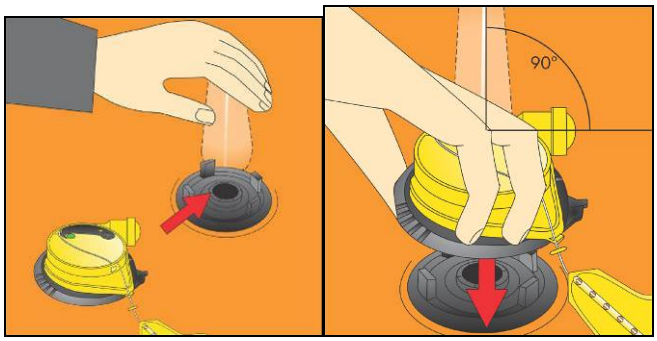
Figure 21. Re-Arming the MD4030 (Step h.)



WARNING: Ensure that the Ballistic Pouch assembly does not interfere with the seal between the Inflator Cap and Body. Failure to clear interference may result in leakage upon activation and malfunction.

i. While pressing FIRMLY onto the inflator body, turn the BLACK locking ring clockwise into the locked position (see Figure 22). Pull on the cap to make sure it has locked onto the inflator body.

Figure 22. Re-Arming the MD4030 (Step i.)

Black Locking Ring

j. Check: To see that the single point status indicator on the cap is green, the pull to inflate lanyard is present and attached, and that the locking ring is locked.

k. Close up the cover and re-pack the life preserver per Section 5.0. Repeat process for the other lobes.

NOTE: For additional clarity and instructions on how to pack the life preserver, refer to the Packing Instructions in Section 5.0.

4.2 RE-ARMING THE MD4030 COMPACT DTLP WITH BALLISTIC CYLINDER PROTECTION

When re-arming the MD4030 Compact DTLP with Ballistic Cylinder Protection (using MA4060 DT Re-arm Kit), the procedure is identical to the instructions listed above. For Re-Arming Instructions, refer to Section 4.1.

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4.3 CONVERSION OF THE MD4030 BETWEEN AUTOMATIC AND MANUAL INFLATION

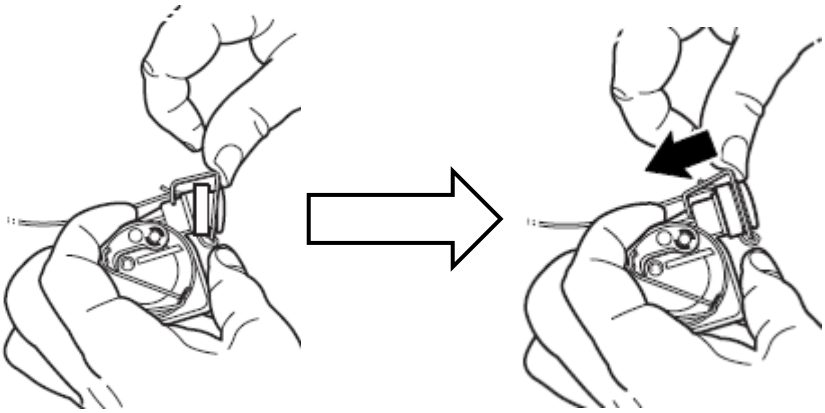
The following procedures are used when converting the MD4030 Compact DTLP from automatic to manual modes. The MD4030 may be changed back to its automatic mode by removing the conversion cap and reversing the procedure.

Warning: When configured for manual only operation, the MD4030 will not inflate on water contact unless the wearer activates the inflator.

a. Partially open the Compact DTLP zipper on one lobe to provide access to the inflator assembly.

b. Position the conversion cap over the inflator's hydrostatic valve opening. The conversion cap's metal clip should be placed along the top of the inflator's hydrostatic valve (see Figure 23). Secure the conversion cap to the inflator's hydrostatic valve by applying pressure to the cap, at the metal clip.

Figure 23. Mounting Manual Conversion Cap Instructions



c. A hole cut into the neoprene Anti-Chafing Cover is used to secure the cover over the face of the Inflator Assembly, while the pocket fits over the end of the Manual Conversion Cap (see Figure 24).

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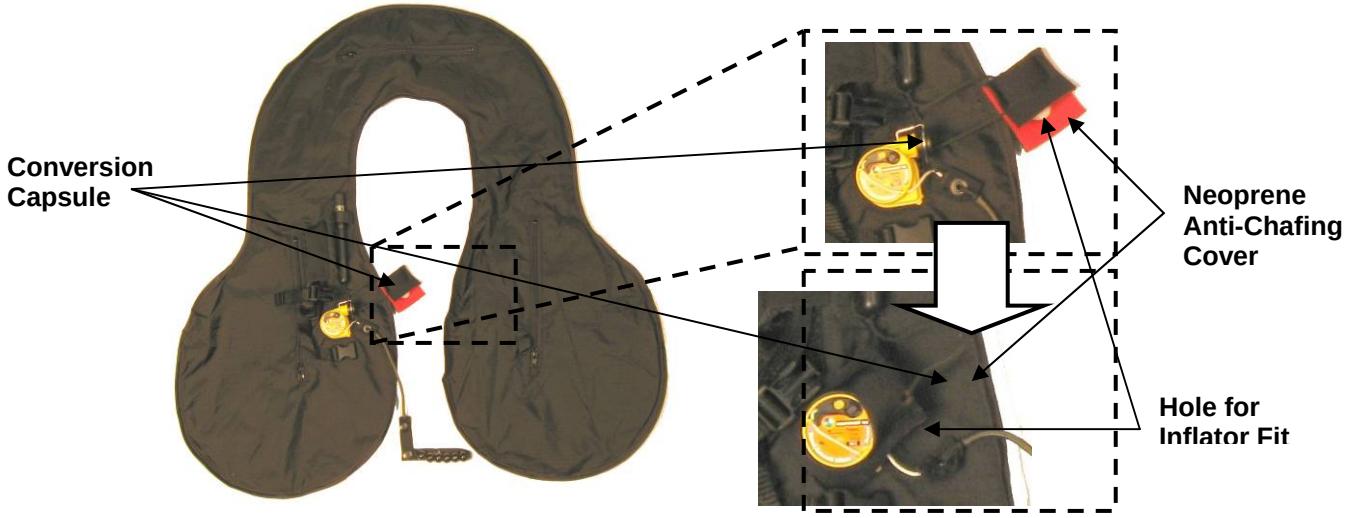
Figure 24. DTLP Life Preserver: Mounting Conversion Cap Anti-Chaff Cover



d. Close the cover and re-pack the life preserver as per Section 5.0. Repeat process for the other lobe.

Warning: Converting only one inflation system to manual only operation does not change the entire system. Both inflation systems must be converted to Manual Mode in order to prevent deployment upon contact with water. The reverse is also applicable. If only one inflator is armed in Automatic Mode, the device will not function properly.

4.4 RE-ARMING THE MD4035 FR

Warning: Use a Mustang Survival Re-Arm Kit (MA4065) for this procedure. Use of other Re-Arm Kits may result in improper operation or failure to operate and will void the product's warranty.

NOTE: The "Damage Tolerant" bladder feature of the DTLP will operate regardless of use of the Ballistic Pouch. The MD4035 can be configured with the pouch for extra protection, or without the pouch in lower threat or training scenarios. The Ballistic Pouch when used with the manual inflator CAN be re-used once the cylinder is fired.

a. To access the inflator system, partially unzip the cover. Carefully open the cover and unfold the bladder. To avoid inadvertent inflation, detach the beaded handle while re-arming. If the Damage Tolerant Ballistic Cylinder Pouch is not used or present, simply unscrew and discard the used CO_2 cylinder (see Figure 25). If the cylinder is pierced or under weight, reject and replace the cylinder. If a Damage Tolerant Ballistic Cylinder Pouch is present, skip to Section 4.5 for Re-Arming instructions.

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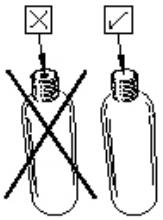
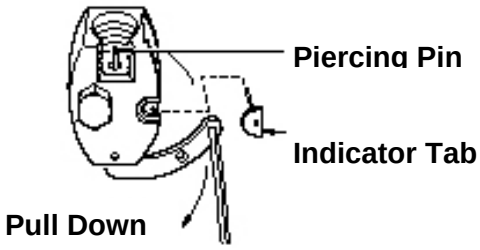
Figure 25. Step a. Re-Arming the MD4035 FR



b. To check that the inflator is fully operational, remove the indicator tab and pull down on the lanyard and see if the piercing pin travels freely. Both the head and lever should easily return to their original position (see Figure 26).

Figure 26. Step b. Re-Arming the MD4035 FR



c. After exposure to salt water or excessive soiling, rinse with fresh water to remove dirt and salt. Completely dry before re-arming.

d. Carefully remove the cap nut and the upper sealing gasket. Then remove the CO_2 inflation device by lifting it off the inflation manifold valve. Inspect the upper and lower sealing gasket (still on manifold valve) for integrity. If defective, deteriorated or cracked, replace with a new gasket.

e. Reinstall the CO_2 inflation device and upper gasket. Install a cap nut and tighten to a torque of 8.0 inch-pounds using a calibrated torque wrench.

f. With the manual lever in the up-and-ready position install the indicator tab into the inflator. Screw the new CO_2 cylinder hand-tight into the inflator. Do not over tighten as this can damage the internal gasket.

g. Close up the cover and re-pack the life preserver per Section 5.0. Repeat process for the other lobe.

NOTE: For additional clarity and instructions on how to pack the life preserver, refer to the Packing Instructions in Section 5.0.

4.5 RE-ARMING THE MD4035 FR WITH BALLISTIC CYLINDER PROTECTION POUCH

To re-arm the MD4035 FR Compact DTLP with Ballistic Cylinder Protection Pouch the cylinder must be manipulated in and out of the Ballistic Cylinder Pouch assembly. The MA4065 Re-Arm Kit can be used for either configuration: with or without the Ballistic Cover Pouch.

a. In order to access the inflator system, partially unzip the cover. Carefully open the cover and unfold the bladder. To avoid inadvertent inflation, detach the beaded handle while re-arming. Note the relevant components to be used for this assembly: an uncompromised

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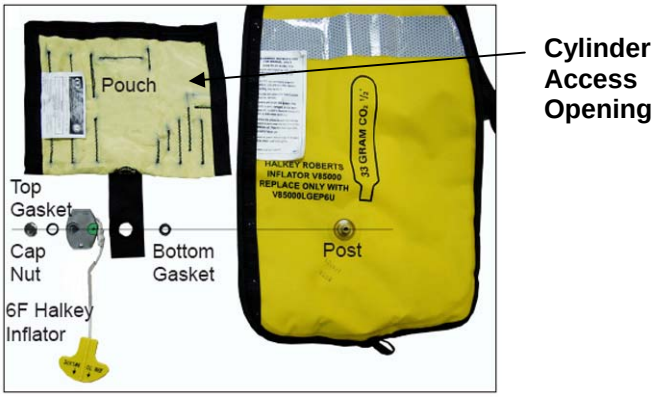
Ballistic Containment Pouch (MA4050) and inflation components as displayed in the illustration below (See Figure 27).

NOTE: The inflatable cell shown in the following section is not the same as the MD4035 FR, but however is adequate for instruction and illustration.

Figure 27. Ballistic Pouch Installation Instructions (Step a.) (MD4035 FR Config. Only)



b. After removing the black nylon cover, the cylinder can be removed via the opening on the side of the Ballistic Pouch. Grip the base of the inflator and unscrew the cylinder then remove it from the pouch (see Figure 28). If the cylinder is pierced or under weight, reject and replace the cylinder.

Figure 28. Re-Arming the MD4035 FR with Ballistic Pouch (Step b.)

c. To check that the inflator is fully operational, remove the indicator tab and pull down on the lanyard and see if the piercing pin travels freely. Both the head and lever should easily return to their original position (see Figure 29).

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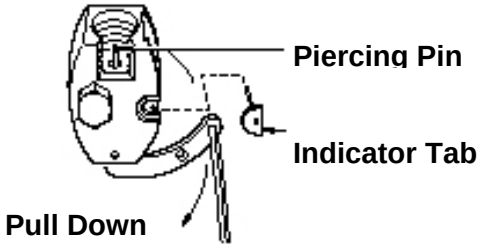
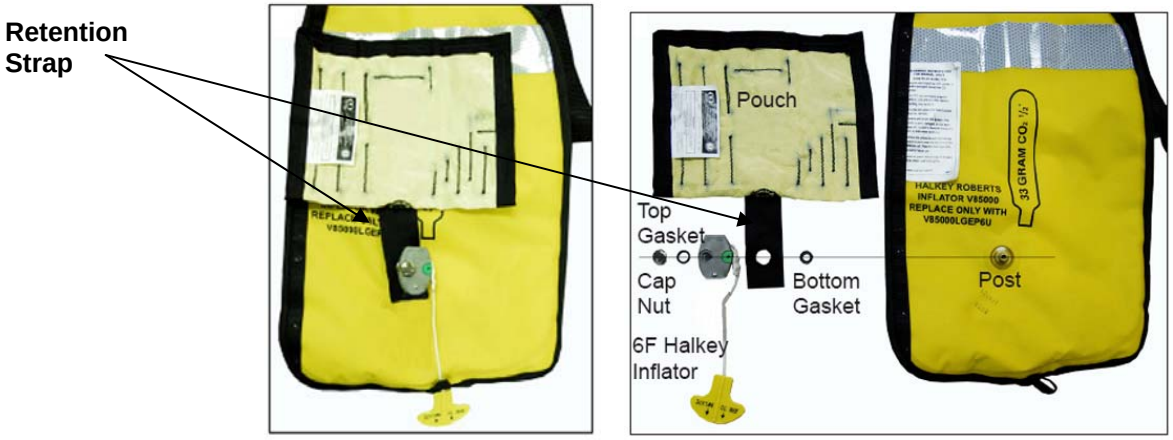
Figure 29. Re-Arming the MD4035 FR with Ballistic Pouch (Step c.)



d. After exposure to salt water or excessive soiling, rinse with fresh water to remove dirt and salt. Completely dry before re-arming.

e. Carefully remove the cap nut and the upper sealing gasket. Then remove the CO_2 inflation device by lifting it off the inflation manifold valve (see Figure 30). Remove the Ballistic Pouch Retention Strap from the Inflator Post. Inspect the upper and lower sealing gasket (still on manifold valve) for integrity. If defective, deteriorated or cracked, replace with a new gasket.

Figure 30. Re-Arming the MD4035 FR with Ballistic Pouch (Step e.)



f. Center the hole on the Ballistic Protective Pouch tether strap over the inflator post to ensure it does not interfere with the sealing surface (interface between the gasket and the inflator) when inflator is attached. Reinstall the CO_2 inflation device and upper gasket. Install a cap nut and tighten to a torque of 8.0 inch-pounds using a calibrated torque wrench.

WARNING: Ensure that the Ballistic Protective Pouch does not interfere with the seal between the Bottom Gasket and Inflator Body. Failure to clear interference may result in leakage upon activation and malfunction.

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g. With the manual lever in the up-and-ready position install the indicator tab into the inflator. Insert the new unused CO_2 cylinder into the inflator through the main Ballistic Protective Pouch opening (threaded end first). Slide the pouch down to expose the cylinder. Rotate the cylinder clockwise to a tight fit into the inflator. Manipulate the cylinder towards the center of the pouch so it is securely held in the "cup area" once it is secure (see Figure 31). Do not over tighten as this can damage the internal gasket.

Figure 31. Re-Arming the MD4035 FR with Ballistic Pouch (Step g.)

h. Fold the Ballistic Protective Pouch around the cylinder and insert the assembly into the black nylon cover (see Figure 32).

Figure 32. Step h. Re-Arming the MD4035 FR with Ballistic Pouch

i. Close the cover and re-pack the life preserver per Section 5.0. Repeat process for the other lobes

NOTE: For additional clarity and instructions on how to pack the life preserver, refer to the Packing Instructions in Section 5.0.

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5.0 DONNING AND PACKING INSTRUCTIONS

5.1 GENERAL

WARNING: The MD4030 and MD4035 FR shall be worn with all life preserver components fully assembled. The modules shall not be worn separately.

5.2 ASSEMBLY, FOLDING AND PACKING INSTRUCTIONS

5.2.1 To assemble, fold and pack the Compact DTLP:

NOTE: All location reference points in this section are based from the perspective of the person wearing the Compact DTLP (i.e.: "right" is the wearer's right side).

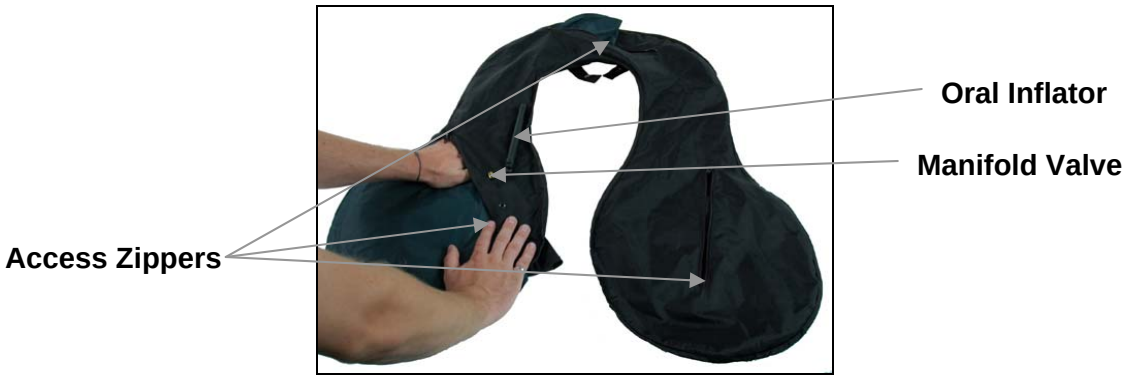
NOTE: These instructions illustrate the life preserver when it is completely disassembled. Disassembly of the life preserver is performed by following the instructions in reverse order.

a. Lay the Compact DTLP and it's sub-components out on a flat, clean surface.

NOTE: The bladders do not need to be removed from the restraint layer if the Compact DTLP has not been deployed. If not deployed, proceed to step h

b. If the Compact DTLP is fully assembled, remove the inflatable cells by unzipping the protective cover starting at the Velcro™ break-out tab at the back of the collar. Carefully remove the beaded handle assembly. Remove the automatic inflator assembly (see Step f, Figure 37) then remove the inflatable cells from the restraint layer through the 3 inflatable cell access zippers. Beginning with the removed inflatable cells (both right and left), ensure that each cell chamber is **completely evacuated** prior to proceeding. Once all residual gas has been removed from the inflatable cell, lay the inflatable cell flat and pull all significant wrinkles out of the evacuated cell. If the cell has not been deployed it may still be in a half-packed orientation. If it is in the half-packed position, then skip to Step e (Figure 36) as the inflatable cell can be evacuated without fully flattening the device in it's single-layer.

Figure 33. Evacuated Inflatable Cell (Step b.) (MD4035 FR Shown)



c. Starting with the bottom lobe opposite of the inflator manifold and oral inflation tube begin to invert the inflatable cell on itself (see Figure 34). Using the

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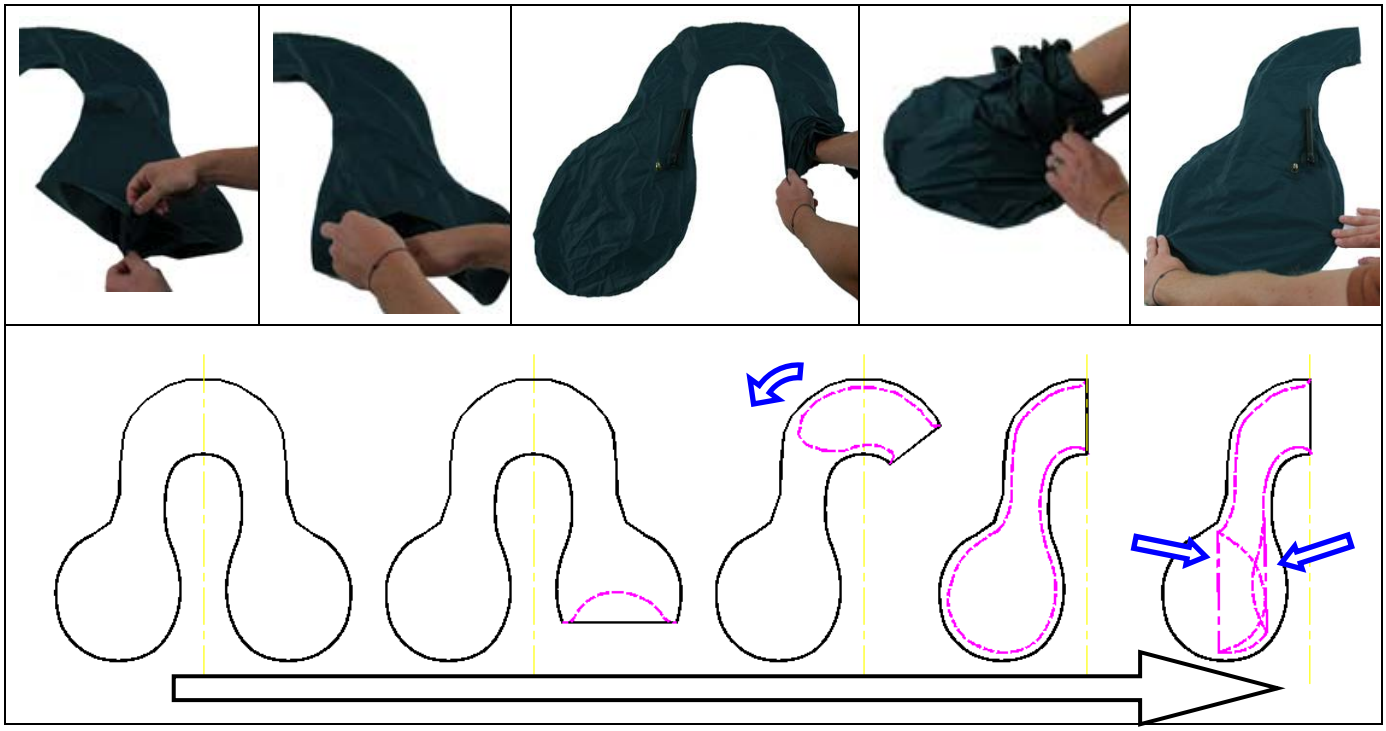
fingertips, grasp both sides of the inflatable cell wall at the bottom of the lobe and separate the inflatable cell walls under vacuum. As the bottom edge of the lobe is drawn inward, assist it further into the inflatable cell cavity by pushing with the tip of your fingers to begin the inversion of the inflatable cell on itself. Continue to invert the left lobe until it is completely pushed into the inner cavity of the right lobe. **Flatten the lobe** by ensuring that the left lobe is forced **into the extremities** of the right inflatable cell. The cell can then be evacuated and the inner **lobe tips can be folded inward again** to create minimal resistance during deployment (see Illustration in Figure 34). Depending on the configuration, the inflation assembly may be required to be installed (and with the Manual Cap engaged, in the case of the MD4030) and the **oral tube locked closed** to promote this "lobe tuck" process. Once the inflatable cell is flattened, the finished external shape will be exactly half of the initial inflatable cell shape. Repeat the same process for the second inflatable cell.

NOTE: Both inflatable cells are identical and only differ by how they are packed into the restraint layer. Each inflatable cell can be substituted for one another (i.e.: right for left, or vice-versa) as long as it passes inspection and testing criteria outlined in Section 7.0.

CAUTION: Proper operation of the device depends on the proper packing sequence. Complete evacuation, flattening of the inflatable cell and careful folding will ensure proper deployment.

Figure 34. Inflatable Cell Inversion Sequencing (Left to Right) (Step c.) (MD4035 FR Shown)



d. Once both inflatable cells are inverted into half-inflatable cell shapes, they will be placed opposite each other to make up the left and right inflatable cells (see Figure 35). The left inflatable cell will have the manifold and oral tube assemblies

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facing toward the work table, and the right inflatable cell will have these assemblies facing away from the table.

Figure 35. Layout of the Half-Inflatable Cell Shapes (Step d.) (MD4035 FR Shown)

e. Beginning with the right inflatable cell, place one of the inflatable cells into the restraint layer through the right lobe access zipper. Feed the oral tube and inflator assemblies through the respective pass-throughs (on the right lobe, these should be on the top face of the restraint layer on the same side of the inflation system). Push the inflatable cell out to the seams of the restraint layer so that the entire assembly is flattened. Ensure that the top end of the inflatable cell is on the top side of the baffle in the collar section of the restraint layer (see Figure 36). Repeat the same process for the second inflatable cell, except ensure that the top end of the inflatable cell is on the bottom (or opposite) side of the baffle in the collar of the restraint layer. Close all 3 access zippers on the restraint layer.

WARNING: Failure to place the inflatable cells on opposite sides of the separation baffle in the collar section of the restraint layer may result in malfunction of the life preserver by improper deployment of the inflatable cell.

WARNING: Failure to close the access zippers on the restraint layer could result in malfunction or catastrophic failure of the life preserver caused by improper restraint.

Figure 36. Placement of the Inflatable Cell into the Restraint Layer (Step e.) (MD4035 FR Shown)

f. **For the MD4035 FR only.** Once the access zippers have been closed on the restraint layer, the inflator assemblies can be re-mounted onto the manifold valve on each cell. Ensure that a new bottom gasket and top gasket are used if the existing components are old or show any degradation. Using a 9/16” socket and calibrated torque wrench, install the cap nut and tighten to a torque of 8.0 inch-pounds. Repeat the same process for both inflator assemblies on each inflatable cell. **For the MD4030 only.** The procedure is

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identical to the MD4035 FR sequence listed above, except the inflator does not require re-mounting. Repeat the same process for both inflator assemblies on each inflatable cell.

NOTE: For additional clarity and instructions on how to assemble the inflator assembly, refer to the Re-Arming Instructions in Section 4.0 .

Figure 37. Mounting the Inflator Assembly (Step f.) (MD4035 FR Shown)

g. Assemble the components of the life preserver. When the inflatable cell assembly has been attached to the restraint layer the device is ready for arming and packing. Ensure the secondary donning strap has been placed inside the elastic retainer pouch. (Step g.) Both oral tubes should be locked open to allow inflation after deployment. Lay the device out flat on the table.

Figure 38. Life Preserver (Step g.) (MD4030 Shown)

h. Ensure the device is properly armed, see Section 4.0 for Re-Arming Instructions.

i. Once the inflators are armed the device is ready for folding. Begin the folding procedure with the back collar. Fold 1 is made by folding the top half of the collar over the bottom half of the lobe. The fold line should be at the rear attachment points between the restraint layer and protective cover.

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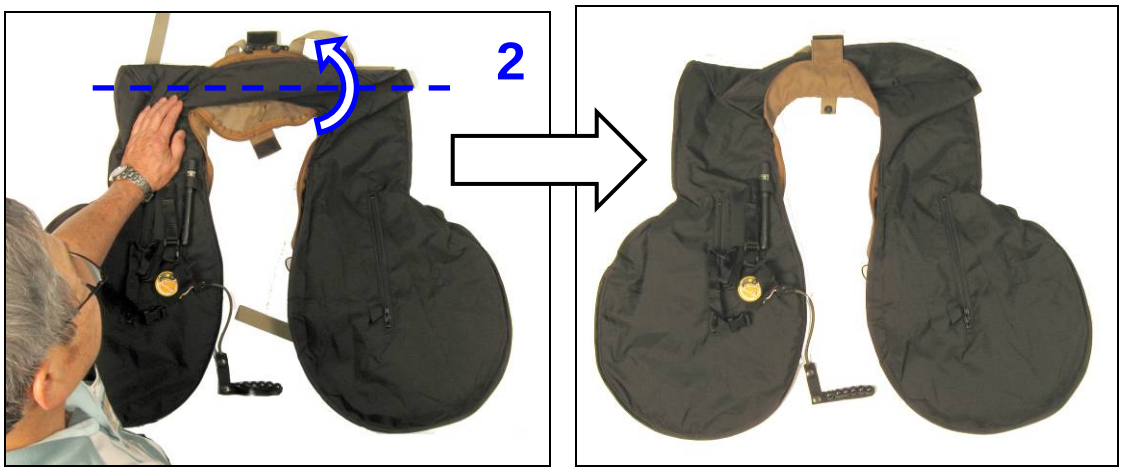
Figure 39. Layout and Packing Fold 1, Back Collar (Step i.) (MD4030 Shown)

j. The second fold is made by folding the top tip of the collar back over on top of the first fold. The Velcro™ Breakout Tab at the back can be used to temporarily hold the folded assembly in place while the next steps are completed.

Figure 40. Packing Fold 2, Back Collar (Step j.) (MD4030 Shown)



k. Remove each slider from one side of the zipper tape. With the zipper tape separated, move each slider to the center back area of the collar in the vicinity of the Velcro breakout tab. Carefully open the Breakout Tab, to attach each slider to the other side of the zipper tape. Attention should be given to keep the zipper assemblies centered on both sides of the tape. Once the zippers have started to close the teeth, the Breakout Tab can be re-closed to prevent deployment.

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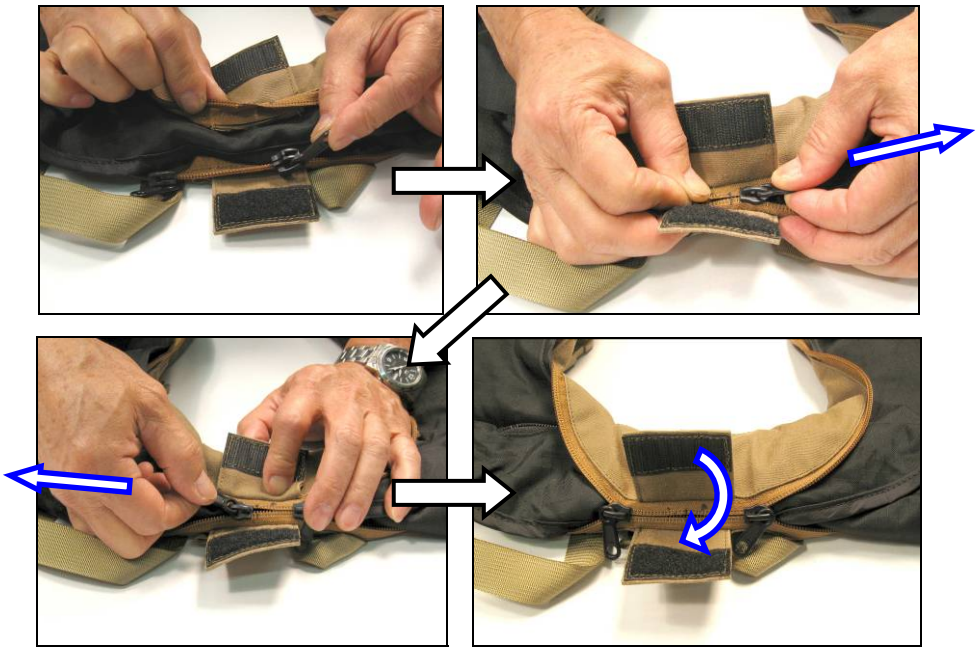
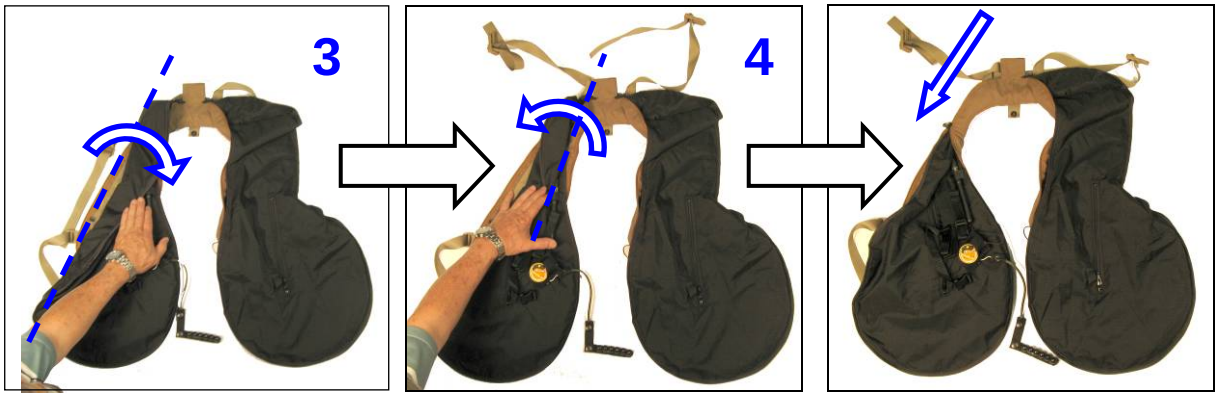
Figure 41. Packing, Breakout Zipper Fasten (Step k.) (MD4030 Shown)



l. Continue packing the right lobe. The third and fourth folds are made at the upper narrow region on top of each other (see Figure 42). Once these folds are in place, the right lobe zipper can be partially closed over the area in order to contain the folds (being cautious not to catch the restraint layer in the slider on closing).

CAUTION: When backing up the zipper, use caution not to catch the restraint layer in the teeth or slider to prevent tearing of the restraint layer.

Figure 42. Packing Folds 3 & 4, Narrow Collar (Step l.) (MD4030 Shown)



m. There is a zipper on the edges of the bottom of each lobe (see Figure 43). This is the attachment for the secondary breakout and is optional for functional operation of the DTLP. If the secondary breakout zipper is used, the device can be configured to operate as an (approximately) 35 lb floatation device with a single cylinder operation, and optional 65 lb floatation device with the second cylinder operation. Without this secondary breakout zipper, the device functions only as a 65 lb floatation device. The

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secondary breakout zipper forms a smaller restraint layer, and is designed to "pop-open" to the full restraint layer upon the activation of the second (or both) cylinders. It is armed by closing the right-edge to the left edge of the lobes to each other by closing the zipper from bottom to top and running the slider to the top of the chain. If closed properly, the inflation device and inflation indicator should still be visible, and the edges of the lobe are folded on the opposite side of the device. Once closed, the device can be secured with the cable-tie(s) provided in the re-arming kits (see Note below). Excess cable is not recommended to be trimmed.

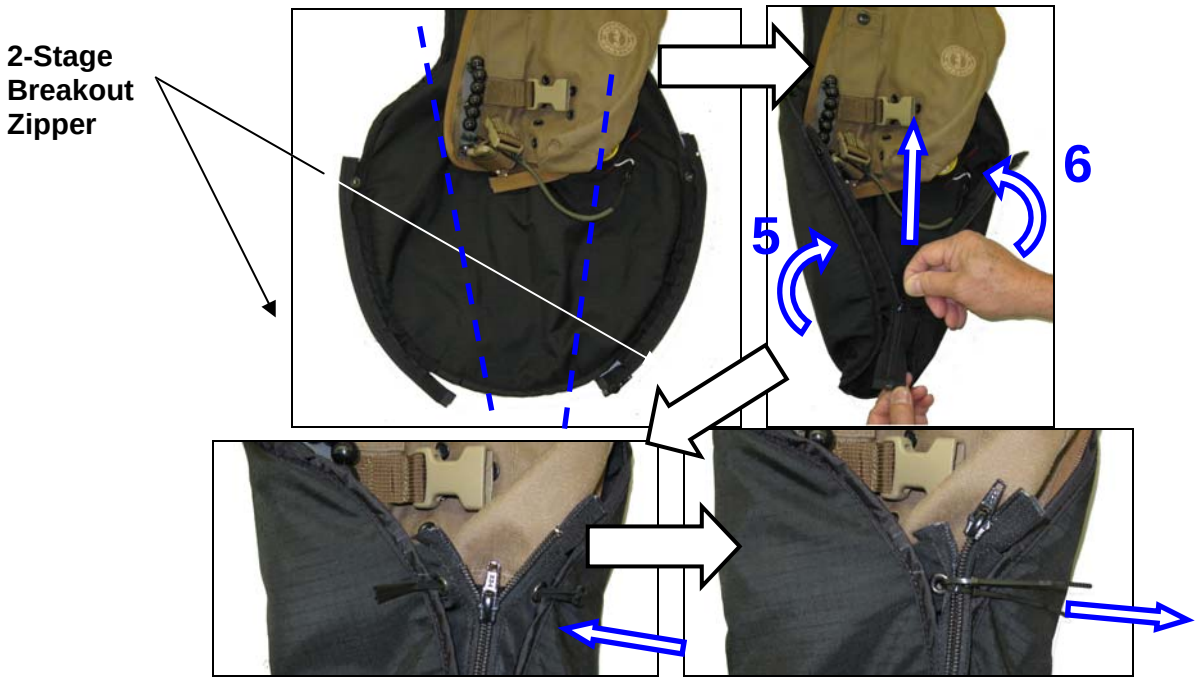
NOTE: When operating in normal or hot environments, two cable ties are likely necessary for proper 2-Stage deployment. When operating in cold environments, only the use of a single tie is necessary. Breakout performance is variable with operating temperature and operational altitude, as changes will effect the operating pressure of the device.

NOTE: The secondary breakout zipper is optional, of which provides two inflation modes: half buoyancy device and full buoyancy (65 lb) device. The DTLP operates only in a 65 lb device mode without this feature utilized.

CAUTION: Omition of the cable tie with the secondary breakout zipper will cause the device to operate without this feature. The zipper is designed to easily separate at both top and bottom upon inflation, immediately after the inflation pressure releases the cable-tie when properly secured.

WARNING: Use of a cable-tie other than the components provided in the re-arm kit may cause inflation failure or catastrophic malfunction.

Figure 43. Packing Folds 5 & 6, Right Lobe (Step m.) (MD4030 Shown, Back Side)



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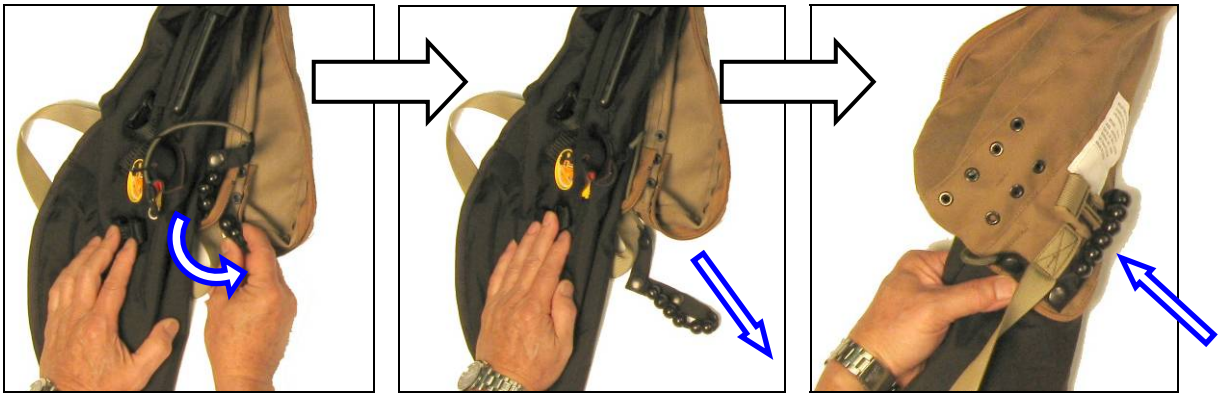
n. Next the Beaded Inflation Handle and lanyard can be passed through the end of the zipper tail (underneath the zipper tape loop between the end that is tack-sewn and the adjacent fixed end). The assembly can be pulled through carefully and attached to the snap locations on the back side of the protective cover.

Figure 44. Packing, Right Lobe Inflation Handle (Step n.) (MD4030 Shown)



o. The seventh fold is made by folding the right half of the right lobe over top of the cylinder assembly at the edge of the attachment point to the protective cover. An extra may be necessary to gather the contents over the area of the protective cover back panel. If done correctly, at this point all vertical folds on the right lobe are complete and the packaged inflatable cell assembly should fit within the width of the back panel of the protective cover. Using your thumbs to crease a horizontal fold at the base of the inflator assembly, fold the lower portion of the flaked inflatable cell assembly over top of the inflator assembly to make the eighth fold. The bulk of the contents of this fold should be moved toward the outer breakopen zipper, so as to allow this bulk to pull open during deployment. The entire right lobe assembly should be folded over the back panel of the protective cover. Ensure that the lever and lanyard have a clear sweep and pull path toward the center of the life preserver prior to closing the protective cover zipper closure. The cover can be closed over the folded lobe assembly and the zipper can be closed and tucked into the cavity at the bottom of the lobe.

NOTE: The zipper can be tucked into the cover and retrieved for easy access to the inflation system for inspection or configuration change. If the zipper is pushed too far into the protective cover, it may separate. If this happens, carefully re-open the zipper from the Breakout Tab, reset the zipper and re-close the assembly. Re-folding should not be necessary for this procedure if done with care.

NOTE: Ensure the inflator handle lanyard is tucked into the cover to avoid creating a snag hazard.

CAUTION: Failure to fold the 2nd-Stage Breakopen near the breakopen zipper may cause incomplete breakout and potential bladder damage.

WARNING: Failure to ensure that the lever and lanyard have a clear sweep and pull path toward the centre of the device may result in life preserver malfunction by failure to activate manually.

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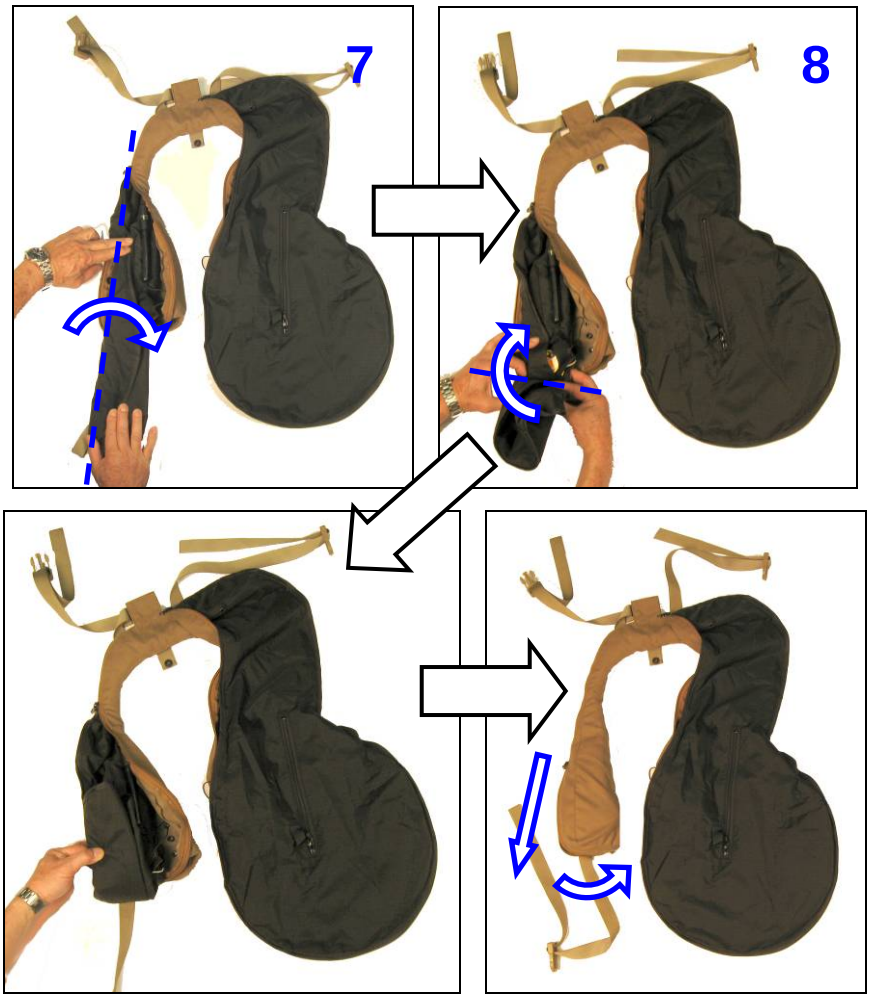
Figure 45. Packing Folds 7 & 8, Right Lobe (Step o.) (MD4030 Shown)



p. Packing the left lobe is similar, but not identical to packing the right lobe. The ninth fold (first on the left lobe) is made by flake folding the narrow region, similar but opposite to the third fold. The tenth fold is similar and opposite to the fourth fold. Once these flake folds are in place, the left lobe zipper can be partially closed over the area in order to contain the folds (being cautious not to catch the restraint layer in the slider on closing).

NOTE: The entire folded assembly of each lobe is required to be contained within the footprint area of the back panel of the protective cover. Use this panel as a reference area when packing the life preserver.

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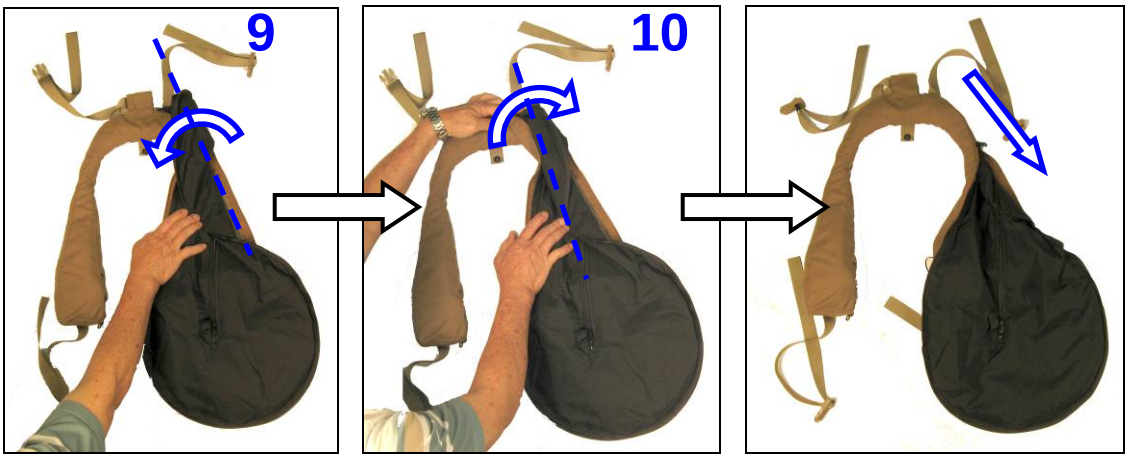
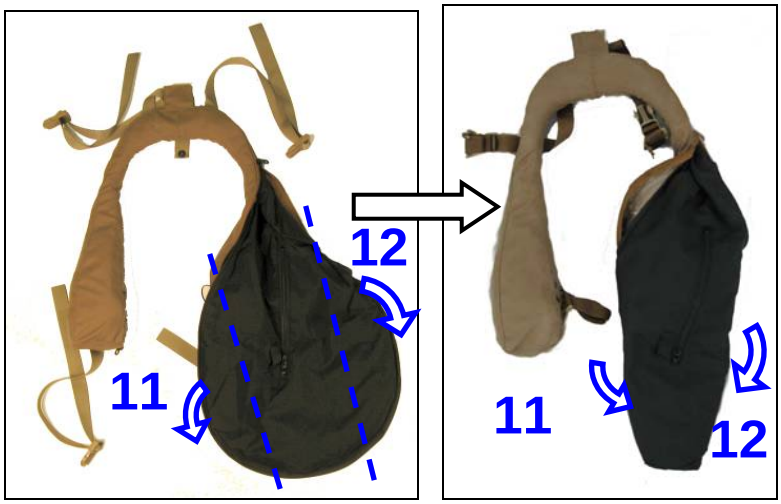
Figure 46. Packing Folds 9 & 10 (Step p.), Left Lobe (MD4030 Shown)



q. The next two folds are similar to the right lobe and secured by the 2-stage zipper.

Figure 47. Packing Fold 11 -12 (Step q.), Left Lobe (MD4030 Shown)



r. The thirteenth fold halves the left lobe, preparing it for folding into the container.

Figure 48. Packing Folds 13 (Step r.), Left Lobe (MD4030 Shown)

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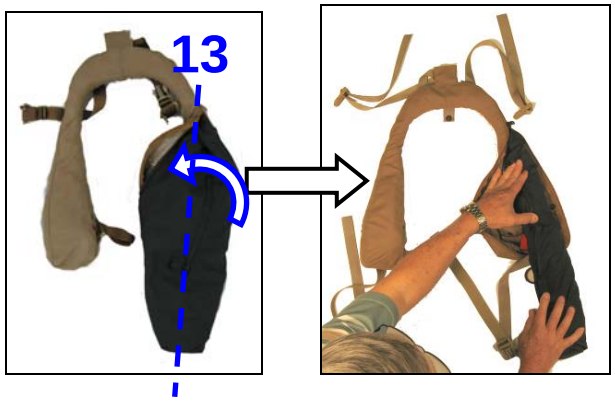
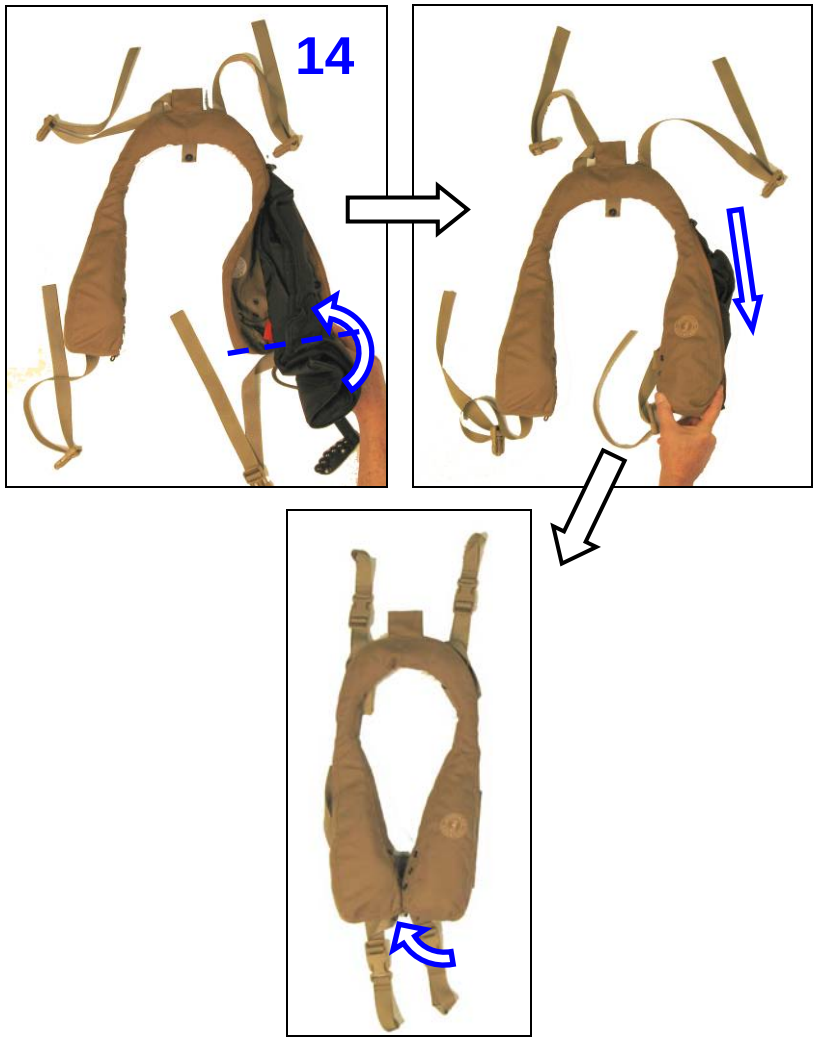


s. The remainder is folded into the container and secured by the closure zipper.

Figure 49. Packing Fold 14 (Step s.), Left Lobe (MD4030 Shown)



NOTE: The zipper can be tucked into the cover and retrieved for easy access to the inflation system for inspection or configuration change. If the zipper is pushed

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too far into the protective cover, it may separate. If this happens, carefully re-open the zipper from the Breakout Tab, reset the zipper and re-close the assembly. Re-folding should not be necessary for this procedure if done with care.

WARNING: Be sure the inflator on the left lobe is not sandwiched between folds. Failure to ensure that the lever and lanyard have a clear sweep and pull path toward the center of the device may result in life preserver malfunction by failure to activate manually.

CAUTION: Take care to re-fasten the Velcro™ Breakout Tab on the collar carefully. Failure to do so can cause the protective cover zipper to open prematurely.

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6.0 MAINTENANCE AND CARE

6.1 GENERAL

6.1.1 After immersion in water (other than fresh clean water), the Compact DTLP should be rinsed thoroughly. To increase the life of the device, it is recommended to launder the components of the Compact DTLP only when required.

6.2 CLEANING

6.2.1 Laundering Procedures

NOTE: Do not dry clean.

Do not use bleach or other chlorine products.

Do not use fabric softeners.

Do not tumble dry.

Do not iron.

Do not dry in front of a radiator or other source of direct heat.

Do not store in a wet condition.

a. Separate components: protective cover, restraint layer and inflatable cell.

Caution: The inflatable cell should not be laundered. Hand clean using a moist cotton cloth and water only. Cleaning materials or solvents shall not be used as it will cause damage to the fabric.

b. Hand wash or sponge down an area of the protective container or restraint layer in warm (100°F) soapy (using mild laundry detergent) fresh water, then rinse with clean water. If machine washing the protective cover or restraint layer, use the gentle cycle with a mild detergent or soap.

c. Hang dry the components in a well-ventilated area, which is free from direct sunlight. Ensure the protective container, restraint layer and inflatable cells are completely dry before reassembling.

d. Reassemble the Compact DTLP.

6.2.1.1 To avoid mildew, hang dry the Compact DTLP after every use, and be sure not to stow the product away while damp.

6.3 TREATMENT AFTER IMMERSION

6.3.1 Whenever a Compact DTLP has been immersed in water, it must be treated as specified below and then inspected in accordance with the current authorized servicing schedule.

6.3.2 Fresh Water Immersion

6.3.2.1 Allow the Compact DTLP to dry naturally, preferably in open air.

Caution: Ensure that each component is completely dry before re-packing.

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6.3.3 **Salt Water Immersion**

6.3.3.1 Disassemble the components and rinse thoroughly with clean, fresh water. Allow the Compact DTLP components to dry naturally, in open air.

Caution: Ensure that each component is completely dry before re-packing.

6.3.4 **Chlorinated Water Immersion**

6.3.5 Immersion of the Compact DTLP in chlorinated water is not recommended. If the Compact DTLP is immersed in chlorinated water, use the same washing procedure as for salt water immediately following immersion.

6.4 **SERVICE LIFE**

6.4.1 The Compact DTLP's service life is determined on condition rather than age. Compact DTLP's may remain in service as long as they are properly maintained and all test and inspection results are satisfactory.

6.5 **WORK AREA**

6.5.1 The work area where inspection and maintenance of the Compact DTLP is performed should be clean, smooth and flat so the Compact DTLP will not snag, tear or otherwise be punctured or damaged. The work surface should also be cleared of all non-essential equipment and materials.

6.5.2 The working surface should be free of harmful contaminants such as oil, grease, acids or solvents. Work areas, subject to wide temperature variations, should be avoided.

6.6 **STORAGE**

6.6.1 The life preservers shall be stored in the following manner:

a. The Compact DTLP shall be stored in a cool, dry area where an even temperature can be maintained.

b. The Compact DTLP shall not be stored in direct sunlight, and must be kept free from petroleum products, acids or other damaging contaminants.

6.7 **EQUIPMENT REQUIRED**

6.7.1 No special equipment is required for maintenance of the Compact DTLP.

6.8 **MAINTENANCE REPORTING**

6.8.1 Maintenance performed on the Compact DTLP assembly shall be logged and reported as the user's system requires.

6.8.2 Compact DTLP units deemed not suitable for service shall be destroyed.

6.8.3 There is an Inspection Block on the collar portion of each inflatable cell that allows the test information (type, date, signature) to be recorded on the Compact DTLP. There is also an exterior pocket on the back of the Protective Cover that is designed to hold a Maintenance Service Card as well.

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7.0 INSPECTION AND TESTING

7.1 REQUIREMENTS

7.1.1 The Compact DTLP shall be inspected at the following intervals, as deemed appropriate by the user's specific inspection requirements:

a. Inspection upon receipt from the supply depot.

b. Visual inspection before issue, use, and upon return of the Compact DTLP to the user's issuing facility.

c. Periodic maintenance inspection not to exceed 360 days. Frequent use requires more frequent maintenance inspections.

d. Inspection after every CO_2 or oral inflation.

e. Inspection whenever the integrity of the Compact DTLP is in question.

7.2 INSPECTION UPON RECEIPT FROM SUPPLY DEPOT

7.2.1 An initial inspection shall be performed by qualified life support technicians upon receipt from the supply depot. This inspection shall include all items listed under the Maintenance Inspection Section.

7.3 PRE-USE AND POST-USE INSPECTION

7.3.1 The individual to whom the Compact DTLP is issued or assigned should carry out a visual inspection of the life preserver prior to, and after, each use. The visual inspection should consist of the steps outlined in Section 7.4.2 only.

7.4 VISUAL INSPECTION

7.4.1 A visual inspection by the user of the Compact DTLP shall ensure the integrity and condition of the protective cover.

7.4.2 Visual Inspection of the Protective Cover

7.4.2.1 A visual inspection of the protective cover shall consist of the following:

a. Ensure the unit is dry.

b. Check for the presence of all components.

c. Check for excessive wear or damage to the material, particularly stiffness, discoloration, burns, tears, abrasions, and frayed or separating edges.

d. Check for separation of seams and broken or missing stitching.

e. Ensure all components are intact and free from damage or corrosion.

f. Ensure buckles are intact and operating properly.

g. Ensure all adjustment straps operate freely and smoothly.

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h. Ensure the beaded CO_2 inflation handle is intact and properly secured to the protective cover.

i. Ensure the life preserver protective cover is properly secured at the Velcro™ tab found at the back collar zipper terminal.

j. Ensure the inflation assembly are armed and ready for deployment by verifying indicator status and equipment arrangement. Access to view the inflation systems can be made by using the lower lobe zippers on each side of the life preserver. Check for a green inflator status indicator.

Warning: The MD4030 positive indicator is green. The MD4035 FR will have a green safety pin installed in the inflator. If the MD4030 indicator is red, it needs replacement.

7.5 MAINTENANCE INSPECTION

7.5.1 Maintenance Inspections shall be performed by qualified life support technicians in accordance with this manual.

7.5.2 Perform the following tests and inspections, in this order:

a. Visible inspection of inflatable cells and restraint layer

b. Perform the oral inflator valve test as per Section 7.6.

c. Perform the inflatable cell test as per Section 7.7.

d. Perform the CO_2 inflation device test as per Section 7.8.

e. Perform the CO_2 cylinder weight test as per Section 7.9.

f. Reassemble the Compact DTLP unit and perform the visual inspections as per Section 7.4 above.

7.5.3 Visual Inspection of the Inflatable Cells and Restraint Layer

7.5.3.1 A visual inspection of the inflatable cells and the restraint layer shall consist of the following:

b. Open the protective cover by separating the Velcro™ tab at the rear collar and pulling the zipper halves apart.

c. Ensure the life preserver inflatable cell is properly secured to the protective container.

d. Open the three cell access zippers on the restraint layer to inspect the cell. Pull each cell out of the lower access zippers to inspect the cells.

e. Check for condition of all Radio Frequency (RF) seams and bonding. If any damage is found (i.e. bubbling or burns in fabric, breaks, cuts or tears on weld), the cell must be replaced.

f. Check to ensure that each cell has been inverted on itself to make a half cell shape.

CAUTION: A non-inverted cell will cause the device to perform other than as designed may cause device malfunction.

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g. Check to ensure that each cell is on either side of the separator at the back collar of the restraint layer. Carefully reposition the inflatable cells back into the restraint layer making sure that the mid-section of each collar is on opposite sides of the collar baffle.

CAUTION: Cells on the same side as the baffle may bind, snag or deploy improperly and may cause device malfunction.

h. Check the restraint layer for physical damage and excessive wear, e.g., abrasion, holes, cuts, tears or checking. If any damage is found, the restraint layer must be replaced.

i. Check for integrity of both oral inflators. Check to ensure locking ring operates freely.

j. Check for integrity of all grommets, anchor patch assemblies, and seam assemblies. If any damage is found, the respective restraint layer must be replaced or inflatable cell must be repaired.

k. Check for the integrity of the secondary breakopen zippers and grommets, as well as verification of the breakopen cable-ties (if applicable).

l. Remove the CO_2 cylinder and ensure the cylinder has not been fired or pierced. Perform the cylinder weight test per Section 7.9.

m. Ensure the inflation systems are armed and ready for deployment by verifying indicator status. Access to view the inflation systems can be made by using the lower lobe zippers on each side of the life preserver. Check for a green inflator status indicator.

Warning: The MD4030 positive indicator is green. The MD4035 FR will have a green safety pin installed in the inflator. If the MD4030 indicator is red, it needs replacement.

n. Re-install the cylinder and check for security and correct installation of the CO_2 inflation device.

o. Ensure the beaded CO_2 inflation handle is properly attached to the operating lever of the CO_2 inflation device. Note any fraying at the attachment point and replace it if necessary.

p. Refold the inflatable cell and secure it within the protective cover (see Section 5.0 – Folding and Packing).

CAUTION: Ensure that the cells are repositioned properly to prevent life preserver malfunction.

7.6 ORAL INFLATOR VALVE TEST

7.6.1 Test both oral inflator valves for leaks:

a. Inflate the inflatable cell chamber to a gauge pressure of 1.0 psig, through the oral tube, or until the cell feels hard to the touch. Ensure the oral tube is locked in the open position.

CAUTION: Inflation of the unsupported cell (i.e. not within the restraint layer) over 2.0 psig can result in catastrophic failure of the life preserver.

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b. Place a small amount of soapy water solution on the stem opening. Use care to prevent the entry of water into the valve. A bubbling of the soap solution indicates leakage.

c. To check the oral inflation valve for blockage; lower the pressure in the inflatable cell chamber to 0.5 - 1.0 psig. Open the air passage by pushing the valve inwards and then blow by mouth through the oral inflator valve. The effort required to inflate the chamber should not be excessive and the valve must close tightly when the oral inflation is halted.

d. Consider the valve non-serviceable if it fails either test and replace the inflatable cell.

7.7 INFLATABLE CELL TEST

7.7.1 There are two independent inflatable cells. Prior to any inflatable cell test, it is imperative that the opposite chamber is first evacuated of all residual gas or air.

7.7.2 To test each inflatable cell:

a. Slowly inflate the cell, through the oral inflation valve, using moisture/oil free pressurized air. Inflate to a gauge pressure of 2.0 psig (140 cm/56 inches of water).

Caution: Inflation of the unsupported cell (i.e. not within the restraint layer) over 2.0 psig can result in premature or catastrophic failure of the life preserver.

b. Allow ten minutes for pressure stabilization, then (if necessary) adjust the pressure to 2.0 psig.

c. Hang the inflatable cell for two hours in an area where the ambient temperature can be maintained, at or near, a constant 22°C (72°F) +/- 5°.

d. The cell is serviceable if, after the two-hour period, the internal pressure in either chamber did not drop below 0.5 psig (corrected for temperature, if necessary). Otherwise the cell has to be repaired or replaced.

NOTE: Both chambers must be serviceable before the life preserver is to be considered usable.

e. Evacuate the tested cell completely of all residual air and repeat steps a through e for the other cell

f. If there is evidence of leakage in any of the valves, replace the suspect valve or bladder assembly and repeat process.

7.8 CO_2 INFLATION DEVICE TEST

7.8.1 MD4030 Automatic Inflator Test

7.8.1.1 To test the inflation systems on each bladder, perform the following:

a. Ensure the status indicator on the inflator cap is green and review service life date.

b. Disassemble inflator system (see Section 4.1 or Section 4.2, as applicable). Ensure the status indicator on the inflator body is also green.

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c. Reassemble inflator system and verify inflation system is properly armed (see Section 4.1 or Section 4.2, as applicable).

d. Repeat process for both bladder / valve assemblies.

7.8.2 MD4035 FR Manual Inflator Test

7.8.2.1 To test the inflation systems on each bladder, perform the following:

a. Remove the CO_2 cylinder (see Section 4.4 or Section 4.5, as applicable).

b. Ensure the green safety pin is in place. Remove and pull the beaded inflation handle several times to ensure smooth and free operation of the operating lever.

c. Check that there is a minimum of a 3.0 mm protrusion of the piercing pin. This is required to ensure that the piercing pin will pierce the CO_2 cylinder-sealing disc when the inflator valve is in the operated/activated position. If the protrusion is less than 3 mm, the device must be replaced.

d. Return the operating lever to the "ready" position.

e. Replace the green safety pin.

g. Replace the CO_2 cylinder and verify inflation system is properly armed (see Section 4.4 or Section 4.5, as applicable).

h. Repeat process for both bladder / valve assemblies.

7.9 CO_2 CYLINDER INSPECTION AND WEIGHT TEST

7.9.1 All carbon dioxide (CO_2) cylinders (or their respective assemblies) should be weighed and inspected regardless of whether they are new, or previously fitted cylinders that appear to be serviceable.

7.9.2 MD4030 Cylinder Weight Test Inspection

7.9.2.1 To inspect the cylinder, perform the following:

a. Disassemble inflator system (see Section 4.1 or Section 4.2, as applicable).

b. Weigh the cylinder assembly with a scale, which is accurate to 0.1 gram. The cylinder assembly will consist of either of the two following configurations: 1). DT Config: cylinder, inflator body (adhered to cylinder), ballistic pouch, shrink tubing and adhesive label, or 2). Non-DT Config: cylinder, inflator body (adhered to cylinder), and adhesive label. The measured weight should not be lower than the gross weight printed on the adhesive label. Cylinders not meeting the gross weight specifications should be retained only for training or test purposes and must be clearly marked "NOT FOR SERVICE ".

c. Inspect the interface for damage, and any visible cylinder surface for nicks or dents. Inspect the integrity of the Ballistic Pouch Assembly for degradation of any nature. Verify that the status indicator on the inflator body is green. Cylinders or any aspect of the assembly showing any damage or red-status should be properly disposed of.

d. Reassemble inflator system and verify inflation system is properly armed (see Section 4.1 or Section 4.2, as applicable).

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7.9.3 MD4035 FR Cylinder Weight Test Inspection

7.9.3.1 To inspect the cylinder, perform the following:

a. Remove the CO_2 cylinder (see Section 4.4 or Section 4.5, as applicable).

b. Weigh the cylinder with a scale, which is accurate to 0.1 gram. The measured weight should not be lower than the gross weight marked on the cylinder. Cylinders not meeting the gross weight specifications should be retained only for training or test purposes and must be clearly marked "NOT FOR SERVICE ".

c. Inspect the cylinder threads for damage, the visible cylinder surface for nicks, dents or ballooning and the cylinder neck-sealing disc for scratches or punctures. Cylinders showing any damage should have the gas released under control and then are disposed of as scrap.

d. Replace the CO_2 cylinder and verify inflation system is properly armed (see Section 4.4 or Section 4.5, as applicable).

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8.0 REPAIRS

8.1 GENERAL

8.1.1 Damaged Compact DTLP's shall be repaired in accordance with the following procedures.

8.1.2 Qualified repair personnel can perform some repairs, with adequate facilities. All major repairs shall be conducted by the manufacturer unless otherwise authorized by Mustang Survival Corp. This section provides information to assist with minor or emergency repairs to the Compact DTLP and related components. The protective cover and restraint layer are load bearing components and not repairable. If damaged beyond serviceable condition they shall be properly disposed of .

WARNING: No repair or sewing alteration of the restraint layer is permitted, under any circumstance.

8.1.3 The proper work area is defined in Section 6.5 of this document.

8.1.4 Qualified personnel should only perform repair and overhaul of the Compact DTLP.

8.1.5 No special tooling is required to service or maintain these products.

8.1.6 The service and maintenance reporting procedures are governed by the user's preference or existing systems.

8.2 IDENTIFICATION OF DEFECTS

8.2.1 Defects should be identified in accordance with the inspection and testing procedures detailed in Section 7.0.

8.3 PROTECTIVE COVER AND ATTACHMENT ASSEMBLY

8.3.1 Any harness or protective cover failing inspection should be repaired using the following guidelines.

a. Replace missing components from parts inventory.

b. Clean heavily soiled areas using mild soap and water and a soft, non-abrasive nylon or synthetic bristle brush. Cleaning agents or solvents must not be used.

c. Re-sew worn, broken or missing stitching.

d. Replace damaged fasteners.

e. Replace corroded or damaged metal parts.

f. Damaged or underweight CO_2 cylinders must be disposed of and replaced.

g. Damaged fabric components shall be replaced, repaired or patched.

8.3.2 Those repairs requiring sewing shall be done in accordance with the following section.

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8.4 SEWING

8.4.1 All repairs involving sewing should be done with nylon CSB bonded or Nomex aramid thread. All seam repairs, stitching, and joining shall use a single needle lockstitch, 8 to 10 stitches per inch (25 mm).

8.4.2 Securely backstitch all ends of stitching, including breaks in thread, not less than 0.5 inch (12 mm). Any raw edges of aramid fabric, which become exposed as a result of repairs, must be surged using a four-thread serger, 10 to 12 stitches per inch (25 mm), to prevent unravelling. The construction of all Compact DTLP units use $^{5}/_{16} \pm {}^{1}/_{16}$ inch seam allowances. There shall be no sewing repairs to the inflatable cell.

8.4.3 Damage Treatment

8.4.3.1 Cut away and patch singed, burnt or worn areas of the protective container. See Section 8.4.5 for Protective container fabric patching procedure.

NOTE: Damaged areas in excess of 50 mm (2 inches) in diameter should be returned to the manufacturer for repair or replacement.

8.4.4 Repair Materials

8.4.4.1 The full description and part numbers of the materials required for repairs are detailed in section 9.0 of this manual.

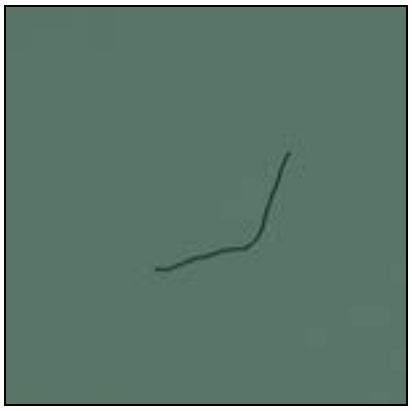
8.4.5 Protective Cover Fabric Patching

8.4.5.1 The fabric color in the following example may not reflect the actual protective container fabric color.

8.4.5.2 To patch minor tears and holes on the protective cover fabric:

a. Clean the area around the tear of foreign material (see Figure 50).

Figure 50. Patching (Step a.)



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b. Cut a square, or rectangle, in the damaged fabric slightly larger than the hole (see Figure 51).

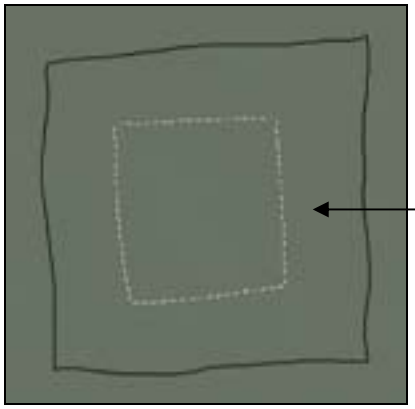
Figure 51. Patching (Step b.)

c. Cut a patch of the original material being repaired, exceeding the hole in size by not less than 37 mm (1 ½ inch).

d. Apply the fabric patch to the outside layer of the protective container and ensure that the weave corresponds to that of the material surrounding the repair area.

e. Single-stitch the patch to the fabric 6 mm (¼ inch) from the edge of the hole (see Figure 52).

Figure 52. Patching (Steps c., d. and e.)



f. Roll an edge of the patch under itself and single-stitch approximately 12 mm (½ inch) from the original stitch.

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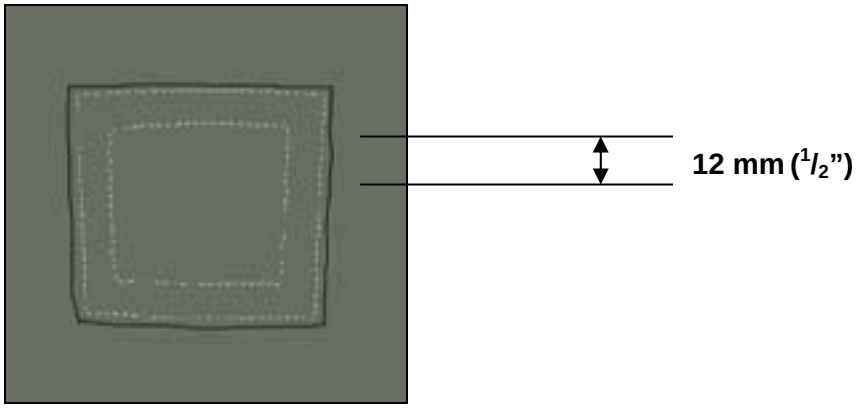
g. Repeat this for each edge of the patch, until it is secured (see figure 53).

Figure 53. Patching (Steps f. and g.)



h. Repair closely grouped small holes or tears with one large patch, rather than several small ones.

8.5 INFLATABLE CELL

8.5.1 Use the Inflatable Cell Test (see Section 7.7) to determine if patching or replacement is required.

NOTE: There shall be no repairs to the inflatable cell. It is an essential life support component and must be replaced if found defective in any way.

8.6 CO_2 INFLATOR

8.6.1 The CO_2 inflator is not repairable and must be replaced when proven defective. See Section 4.1 or Section 4.2 (as applicable) for MD4030 automatic CO_2 inflation device Re-Arming Instructions and Section 4.4 or Section 4.5 (as applicable) to replace the MD4035 FR CO_2 inflation device.

8.7 RESTRAINT LAYER

NOTE: There shall be no repairs to the restraint layer. It is an essential structural component and must be replaced if found defective in any way.

8.8 CO_2 CYLINDER

8.8.1 The carbon dioxide (CO_2) cylinder must be replaced when it fails the weight test as detailed in Section 7.9, has a red-status indication (MD4030), or when there is damage to the cylinder neck sealing disc, threads, or the surface of the cylinder. Use either Re-Arm Kit MA4060 (Standard) or MA4060 DT (Damage Tolerant) for the MD4030 and Re-Arm Kit MA4065 for the MD4035 FR.

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9.0 ACCESSORIES

Contact Mustang Survival to obtain the following Compact DTLP accessories.

9.1 MA4050 BALLISTIC CONTAINMENT POUCH

9.1.1 The MA4050 Ballistic Containment Pouch may be used with the MD4035 FR.

NOTE: The Ballistic Containment Pouch for the MD4030 is included in the MA4060 DT Re-Arm Kit.

Figure 54. MA4050 Ballistic Cylinder Pouch (MD4035 FR ONLY)

9.2 MA4060 RE-ARM KIT, STANDARD (FOR MD4030)

9.2.1 The MA4060 Re-Arm Kit is the “Null” or Non-Damage-Tolerant Cylinder Replacement Kit for the MD4030 Compact DTLP. This kit is an economic option that removes the extra protection afforded to the cylinder assembly, and is suggested for use in low risk or training purposes. The MA4060 Re-arm Kit includes the following: Hammar inflator cap, 33 gram CO_2 cylinder with inflator body, re-arm service key and re-arm instructions. The Beaded Inflation Handle Assembly and Manual Conversion Cap is re-used.

9.2.2 Two re-arm kits will be required if both inflators are fired.

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Figure 55. MA4060 Re-Arm Kit (for MD4030 only)

9.3 MA4060 DT RE-ARM KIT, DAMAGE-TOLERANT (FOR MD4030)

9.3.1 The MA4060 DT Re-Arm Kit is the “DT” or Damage-Tolerant Cylinder Replacement Kit for the MD4030 Compact DTLP. This re-arm kit provides protection to the cylinder assembly, and is suggested for use in high threat operations. The MA4060 DT Re-arm Kit includes the following: Hammar inflator cap, 33 gram CO_2 cylinder with inflator body and Damage-Tolerant Pouch Assembly, re-arm service key and re-arm instructions. The Beaded Inflation Handle Assembly and Manual Conversion Cap is reused.

9.3.2 Two re-arm kits will be required if both inflators are fired.

Figure 56. MA4060 DT Re-Arm Kit (for MD4030 only)

9.4 MA4065 RE-ARM KIT (FOR MD4035 FR)

9.4.1 The MA4065 Re-Arm Kit is the standard Cylinder Replacement Kit for the MD4035 FR Compact DTLP. This re-arm kit is used for either Damage-Tolerant or Non-Damage-Tolerant configurations. The MA4065 Re-arm Kit includes the following: 35 gram CO_2 cylinder, green safety pin and re-arm instructions. The Beaded Inflation Handle Assembly and Damage-Tolerant Ballistic Pouch is reused.

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9.4.2 Two re-arm kits will be required if both inflators are fired.

Figure 57. MA4065 Re-Arm Kit (for MD4035 FR only)

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10.0 ILLUSTRATED PARTS LIST

	Part Number	Item Description
1	MD4035 FR	Compact DTLP (65 lb series), Fire Retardant, Manual Inflation (Aviation Version), with c212
2	MD4030	Compact DTLP (65 lb series), Fire Retardant, Automatic Inflation (Marine Version), with c240
3	MD4030	Compact DTLP (65 lb series), Non-F/R, Automatic Inflation (Marine Version), with DT c13
4	MA4085	MD4035 DTLP 65 lbs – Replacement Life Preserver Cover, 65 lbs, FR, 4-Point Buckle c240
5	MA4085	MD4030 DTLP 65 lbs – Replacement Life Preserver Cover, 65 lbs, FR, 4-point Buckle c212
6	MA4082	MD4035 DTLP 65 lbs – Replacement Bladder, Halkey Roberts 6F Inflation System, No Dump Valve
7	MA4080	MD4030 DTLP 65 lbs – Replacement Bladder, Hammar 1F Inflation System, No Dump Valve
8	MA4083	MD4035 DTLP 65 lbs – Replacement Life Preserver Restraint Layer, Halkey Roberts 6F Inflation System, Covert Bladder with No Dump Valve
9	MA4081	MD4030 DTLP – Replacement Life Preserver Restraint Layer, Hammar 1F Inflation System, Covert Bladder with No Dump Valve
10	MA4090	MD4035 DTLP 65 lbs – Replacement Beaded Handle Assembly (for Halkey Roberts Inflator), 1 Pair (Right & Left)
11	MA4089	MD4030 DTLP 65 lbs – Replacement Beaded Handle Assembly (for Hammar Inflator), 1 pair (Right & Left)
12	MA4091	MD4030 DTLP 65 lbs – Replacement Manual Coversion Capsule and Neoprene Cover (with Hole, Mounts to Hammar Inflator)
13	MA4088 (c240)	MD4035 DTLP 65 lbs – Replacement Harness Loop Attachment Assembly (Female Buckle), Set of 4 – Connects to 4-Point Cover, Color Foliage Green
14	MA4088 (c212)	MD4030 DTLP 65 lbs – Replacement Harness Loop Attachment Assembly (Female Buckle), Set of 4 – Connects to 4-Point Cover, Color Coyote
15	MA4093	Replacement Manual Halkey Roberts 6 F Inflator (with Upper & Lower Gasket) [HD-7718-9 – MD4035 Only]
16	MA4065	Rearm Kit (MD4035)
17	MA4060DT	Rearm Kit with Ballistic Protection Cover for CO2 Cylinder (MD4030)
18	MA4060	Rearm Kit, No Ballistic Protection Cover for CO2 Cylinder (MD4030)
19	MA4050	Ballistic Containment Pouch with Cover (MD4035)
20	MA7159	Bulk Replacement Safety Pins, 100/Box, (MD4035)
21	MA7128	CO2 Cylinder (MD 4035)

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